2nd Annual Undergraduate Scholars Conference
Conference Proceedings

Indiana University of Pennsylvania

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Sponsored by: Dr. Tony Atwater & School of Graduate Studies and Research

April 11, 2007
IUP’s second Annual Undergraduate Scholars Conference was a resounding success with 260 students presenting their work at one of the Conference sessions held in the HUB, Whitmyre Hall, or at the Juried Art Exhibition held in Kipp Gallery in Sprowls Hall. A total of 173 papers, posters, or performances were presented in the HUB and Whitmyre Hall, with an additional 30 works presented in Kipp Gallery later that day.

The Conference featured a lunch and keynote address by Dr. V. Cortez Henderson of the University of Arkansas arranged by the IUP McNair program, and presentations of awards at the lunch program.

More than 90 IUP faculty members mentored and advised the student presenters, served as session chairs, or served on the Undergraduate Scholars Conference Planning Committee. Collaboration and support was also received from Sigma Xi, the University Libraries, the Robert E. Cook Honors College, ARAMARK, the Co-Op Store, and the School of Graduate Studies and Research.

Awards were made to student presenters, including Best in Session Awards; a Best Poster per College Award; a University Libraries Best Bibliography Award by College; an award for Best Conference Performance; a Sigma Xi Best Science Poster Award, and awards to presenters at the Juried Art Exhibition.
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Note: Only abstracts that were available at the time of the compilation of the 2007 Undergraduate Scholars’ Conference Proceedings were included.
1. "Autistic Children in Early Childhood and Elementary Classrooms: Strategies for Teachers and Parents"

*Author: Jeremy Shock*

*Faculty Sponsor: Sara Rutledge*

To many, Autism is one of the most mysterious of childhood disabilities, and it is the most common of the Pervasive Developmental Disorders (PDD). One out of every 150 newborns will have some form of autism (Centers for Disease Control Prevention, 2007). Due to inconsistencies in diagnosis and terminology use before the late '70s, little was known about the disorder and many myths resulted from this lack of information. For instance, in the past, autism was closely paired with schizophrenia and mental retardation. Modern research aids in the better understanding of this fascinating disorder and discounts many of the myths and misconceptions of autism. In addition, new methods of treatment are available and many are adapted for use in the home and school. This presentation will focus on the history and characteristics of autism, the types of autism, and the treatment options for children with autism. Additionally, strategies for assisting autistic children in elementary classrooms will be discussed.

2. "Classroom Application of Multiple Intelligence Theory"

*Author: Joshua Moss*

*Faculty Sponsor: Rene Fetchkan*

The purpose of this study was to investigate food consumption data for the United States and examine, using regression analysis, the linear or exponential trends of the various foods. This study specifically focused on foods commonly used by the fast food industry, beef, chicken, potatoes, etc., given the high volume of food used by fast food restaurants and the recent concern over the quality of food served at these restaurants. This study used the food disappearance data regularly published by the United States Department of Agriculture (USDA). This study examines the relationships between these and other foods and a separate class of demographic variables that may explain the trends shown by consumption data of certain foods. For example, average yearly income, cost of the particular food, and perceived healthiness of the food are examined and compared with food consumption data.
3. "The Perils and Circumstances of Hip Hop/Contemporary Concerts at PWI's"

Authors: Donnetta Allen, Darryl Andrews, Gregory Mounds, and Kristin Shymoniak
Faculty Sponsor: Carolyn Princes

Hip Hop culture, particularly their music is germane to the cultural identity to most African American students. While originally introduced to academic settings primarily by African American students during the late 70's/mid-80's to help "ensure that their cultural music was incorporated into their college experience, too often, many students faced unprecedented problems in their attempts to secure and implement a Hip Hop concert on predominantly white campuses. On the one hand, administrators may be unaware of the stresses students' face in their attempt to implement such a concert. At the same time, they may not be aware of the value Hip Hop culture and its related music is to the success of African American students. This presentation will attempt to address the questions of whether administrators at PWI's are aware of the value of Hip Hop concerts, their relationship to the college success of African American students and the perils and circumstances students face in efforts to implement a Hip Hop concert. It is hoped that this information may facilitate further efforts of securing and implementing such a conference on predominantly white institutions (PWI's) and thus, can be used as a stronger force in more adequately assuming a place in the college success of African American and other students.

4. "Title IX Impact on Male Collegiate Athletes"

Author: Jason Ussack
Faculty Sponsor: Becky Knickelbein

Recent research has shown that sports activity is vital for the development of healthy students. This research examines the extent to which cutting programs could have on a students' mental, physical, academic, and social development. Much research has shown that the enactment of Title IX has generated many new doorways of positive opportunities for female athletes. Unfortunately, according to much of the same research, male programs had to be cut in order to proportionally balance the male and female student athletes with the proposed student enrollment. The goal of this research is to examine whether reducing athletic programs is negative to the development and success of students. A survey will be administered to a sample of college students that will rate the student's level of mental, physical, academic, and social performance. Furthermore, this research explores positive aspects of participating in a sports team and variables to those aspects.
5. "Using Power Point in the Classroom: Working Towards Digital Game Teaching"

Author: Eric Flowers
Faculty Sponsor: Kelli Jo Kerry Moran

If accepted to present at the Undergraduate Scholars Conference I would present work and lessons that I have completed in the use of technology in an educational setting. What makes my work so unique is that the lessons assist teachers and benefit students in many different ways. First my lessons make abstract concepts more concrete to elementary students, while at the same time the lessons touch on both multiple-intelligence and the students' variety of learning styles. One lesson explains the process of The United States and NASA landing on the moon. From lift-off to splash-down the lesson encompasses the Saturn V rocket and how it worked, how the Eagle landed on the moon (including video footage of Neil Armstrong taking the first step on the moon), and an interactive section where the student has to build the Saturn V rocket itself—correct construction results in the lift-off of Apollo 11, whereas incorrect construction results in explosion! These lessons offer immersion in a subject matter and a vicarious hands-on experience that is essentially impossible to attain any other way. In addition to immersion in subject matter, the students are motivated to learn. When these lessons are projected on the wall or watched on a monitor—students immediately become interested in what is happening and what is being taught. An enormous advantage an instructor gains when his or her class is so engrossed in a subject is the opportunity to take that subject cross-curricular. In other words, a lesson about the Americans' trip to the moon evolves from a science subject into: language arts, mathematics, art, geography, social studies, etc. Cross-curricular lessons make it easier for a large diversity of students with multiple intelligence and learning styles to make connections within the curriculum areas, and actually give what they are learning meaning. The work that I have completed in instructional technology offers endless advantages to students, teachers, and education as a whole.

6. "Big Books"

Author: Courtney Lamb
Faculty Sponsor: Frances McAleer

Big Books are an important part of the classroom experience. They provide the teacher and students the opportunity to interact with a book in a way that average books cannot. Creating big books also provides students with the opportunity to work cooperatively with each other to create a new and unique visual representation of a study area. My presentation will look at the benefits and creation of big books at different age levels.
7. "Bullying in the School Setting"

Author: Rebecca Schock  
Faculty Sponsor: James Gibson  
For my poster presentation I plan to research bullying within the school setting. There are varied reasons as to why bullying arises and occurs. My first goal is to research and display this information on my poster. My second goal is to evaluate different ways that students, faculty members and administrators can prevent and/or tackle bullying problems. The information that I find regarding this will also be presented on my poster. I am considering conducting a survey of elementary and middle school age children to get their views on bullying in general as well as their views on bullying within their school. I plan to use several sources for my research including textbooks, peer reviewed journals, news articles, and surveys. My research is in progress, and will be through the time of the conference.

8. "Cochlear Implants"

Author: Meredith Bauer  
Faculty Sponsor: Elesha Rumiński  
This research paper will look at the controversy between the deaf community and cochlear implants. It will include information about how this technology works, who the candidates are, the history and future of them, and about the deaf culture. The project will take the stand that children should get cochlear implants and that parents have the right to choose this for their deaf child. The project will also prove that this technology will drive the deaf community to be nonexistent, which opposes how the deaf culture feels. Being able to hear at a young age greatly affects a child’s language development in the early, most critical years of a child, which is one reason why this technology should be used in as many deaf children as possible.

9. "Six Thinking Hats"

Authors: Kathleen Drevitch, Rae Lynn Kosarik, Jennifer Minner, and Sarah Steele  
Faculty Sponsor: Frances McAleer  
The Six Hats is a tool that has been used by people in the business world and the educational community. This methodology of thinking was invented by Dr. Edward de Bono. His Six Hats is a tool that can empower teachers of any grade and or subject matter to motivate students to use critical thinking skills while expressing inner creativity. By applying the Six Hats to every lesson, teachers can help students explore their own potential by taking an active role in their learning.
10. "Supplemental Instruction: Effect of Attendance on Outcome"

Author: Erin Keller

Faculty Sponsor: Sally Lipsky

Supplemental Instruction (SI), a model of academic support and retention, targets introductory-level courses with high-risk content. For SI, trained undergraduate students are paid to lead weekly out-of-class study/review sessions for their peers, focusing on how to learn difficult course content. Participation is voluntary, though students are urged to attend on a regular basis. Since 1997, SI has been offered at IUP each term and assessed according to prescribed guidelines set forth by the international SI center - analyzing mean final grades and D/F/ withdrawal rates for students who have attended SI sessions one or more times versus students who have not participated. However, the researchers hypothesize that irregular attendance by students during a 14-week term, such as three or fewer sessions, has little impact on their performance in the course. For this project, researchers examine the correlation between students’ attendance at SI sessions and learning outcomes, as measured by final course grades and rates of D/F/ withdrawals.

11. "The Boxcar Integrated Unit Plan"

Authors: Diana Cochran and Jessica Litschge

Faculty Sponsor: Kelli Paquette

An effective, integrated unit plan consists of multiple components, i.e., unit relevancy, Pennsylvania Standards, key definitions, a specific time frame, planning web identifying various content areas, a motivating, introductory experience, engaging lesson plans, varying authentic assessments, multiple resources and references, and a synthesizing, culminating experience. Each part should provide a unique, individual experience for students. When all aspects of a unit plan are well-crafted, a cohesive set of instructions as to content knowledge and instructional delivery strategies for teaching and learning are defined through the resources at hand. A thoroughly-designed unit plan offers many avenues in which each student can learn. Particularly, Howard Gardner's theory regarding the Multiple Intelligences is an effective model to consider when incorporating as many students as possible into the learning process. All students should be provided with multiple methods in order to be actively engaged within the learning process, thereby, further enhancing and developing their cognitive understanding. This will not only have the children recite given material, but will also have the students move to higher orders of cognitive understanding.
12. "Approaches to Materials and Object Making"

Author: Matthew Nauman
Faculty Sponsors: Patricia Villalobos Echeverria and Christopher Weiland

It is my intention to showcase the work I have completed in the last four years at IUP's department of Fine Arts. My current body of work is a combination of furniture, woodturning, wood sculpture, and metal pieces. The work has evolved from traditional furniture design to an exploration of contemporary object-making. I use the phrase object making; because I believe the work can not be labeled as furniture or sculpture alone. I choose to work in wood and metal because I am fascinated by the tactile quality. The materials entice me to stretch the traditional limits of what an object can serve as. I intend to demonstrate not only my understanding of contemporary art but also my approach to design and making.


Author: Alisha McCurdy
Faculty Sponsor: Patricia Villalobos Echeverria

Contemporary artists are facing challenges that are inextricably linked to globalization of philosophies, economic markets, modes of communication, and moving from the local to the global. With this increasingly global community of contemporary art, more artists from formerly underrepresented countries are being included into the international conversation of artistic creation. Art history has traditionally held spotlight on the perceived "core" western art and artists, leaving those from countries in the periphery in the shadows. Questions arise as to whether art history is keeping up with this global trend, and the appropriateness of framing inquiries into non-Western art based upon Western traditions of art history and criticism. My research consists of analyzing writings of contemporary art historians, critics, and curators along side the works of art and artists they are giving attention to via writings, interviews, and acceptance to high-profile exhibitions.
14. "Bookmaking as a contemporary art-form"

Author: Bethany Zidek
Faculty Sponsor: Patricia Villalobos Echeverria

Bookmaking is often overlooked as a viable contemporary form of art. However, this medium holds abundant possibilities for expanding one's artistic ideas and vocabulary. The general structure of bookmaking demands an intimate relationship with the viewer: the book requires the viewer to hold and flip through the pages. A traditional textbook style form is not the only design option. The forms of the book can vary: size, paper, color, images and text are all incorporated into the final piece. The possibilities for images are varied. Any method of printmaking is a viable option for art work within the book. The act of turning two-dimensional works into a three-dimensional book creates a dichotomy unique to this medium. In addition, a book does not require traditional text in the form of a story and the artist still has the opportunity to use imagery with altering forms of narrative.

15. "Building Green"

Author: Kathryn Gagermeier
Faculty Sponsor: Patricia Villalobos Echeverria

In order to allow room for growth one must be prepared to trim away excess. Learning to subsist in this world and construct a sufficient contribution without leaving behind a vast footprint is a fashionable ambition. Green building has revitalized my desire to create and has given my work scope to develop.

This idea of trimming in order to achieve sustainable living is articulated in Marjetica Potrc's book: Urgent Architecture. Potrc focuses her efforts towards the idea of inventive, self-sustainable communities in the contemporary global public. Potrc pushes society to search for individual inventiveness in order to change the way we think about our accountability in the community.

Everyone wants a place to live, and on the ladder of human needs, shelter is second only to food. By building green, we can aid in preserving natural habitats, protect air and water quality, reduce greenhouse gas emissions and solid waste, while simultaneously creating enhanced living situations. A green design is one where the details of both the interior and exterior components have been considered from sketches to construction. Not only can green architecture improve local situations, building green can progress the global environment.
16. "Evidence"

Author: Daniel Brickman
Faculty Sponsor: Patricia Villalobos Echeverria

We live in a fractured and multi-faceted society, and the consequences of an effort for self-definition within vast possibilities for definition will invariably manifest themselves. Freedom of desire is the blessing and the bane of our existence. Physical objects, as evidence, can be a record of that desire. Art is about communication and I am interested in the poetry of materials: how one relates to another and the resulting dialogue between them. My role, as an author, is to allow the decisions I make during the execution of a work to deliver a message that is imagined by the hand and felt in the gut. The succinctness of a communication can be more tangible, and perhaps necessary, than the information contained therein.

17. "Femininity as a Continuum and Gender as a Choice: the Socialization that Separates the Two"

Author: Kirsten Lowe-Rebel
Faculty Sponsor: Patricia Villalobos Echeverria

My work addresses issues that deal with gender and femininity as social constructs. Through examinations of women and their relationship to animals, the use of language presents double meanings to words such as fox, cat, rabbit and chick which become increasingly more complex and sexualized as we mature. I am also interested in the way women are perceived as objects of men's possession. In this session I will explore the intersection of the cultural notions of gender and evaluate the importance of these dichotomies that we are exposed to, particularly the lumping of female sexuality into one very narrow CATegory. Although conflicting, these ideas have become an extremely relevant part of our socialization. Through the use of my current paintings and other theoretical writings, I will contextualize my artistic practice around these concepts.

18. "Linguistic Reconstruction and the Age of Globalization"

Author: Jason Brown
Faculty Sponsor: Patricia Villalobos-Echeverria

As humanity enters the new century, we enter the uncharted economic and socio-political realm of globalization. While we redefine the systems of business, power, and politics, we are then obliged to redefine the statute of art and literature in the new millennium. Through the blurring of international borders throughout Europe and the Americas, the ease of international travel, and the ongoing effects of the global market, we must reassess the concepts and the importance of nationalism, language, and boundaries. In order to create
peace and end bigotry humanity needs first redefine the methods of communication. In order to enter into a global community and cultivate humanity we should attempt to find innovative way of to cultivate understanding. Through the creation of an abstract visual imagery that represents language, it is my hope to evoke an international dialogue about these ideas.

19. "Marc Chagall: There's No Place Like Home"

Author: Chad Santik
Faculty Sponsor: Brenda Mitchell

Marc Chagall, was born to an impoverished Jewish family in Vitebsk, Russia, in 1907. During this time Europe was in clutches of a war, segregating Jewish people and viewing the as, the dirt of society. Chagall moved to Saint Petersburg, with the aspiration of becoming a painter, he was then thrown into jail because; he did not have the proper permit that was required for all Jews to carry within the city limits. During this time of bleak possibilities Chagall created works that are rich in symbolism and are derived from the memories of his childhood, sharing aspects with both Christian and Jewish beliefs, and events that changed the course of humanity. His talent was versatile, ranging from paintings, poetry, theatre and costume design, and finished with elaborate stained glass creations. Through, this wide range of talent, he was able to reach far beyond most who focused on one medium. All of his works are widely sought after by private collectors as well as museums nationwide. Although surrealists attempted to claim him, he was in a category all his own; often imitated, never duplicated.

20. "Mucha Mania"

Author: Courtney Robson
Faculty Sponsor: Brenda Mitchell

Though many artists experienced a type of cultural disillusionment during the early twentieth century, Alphonse Mucha had perhaps the most disheartening struggle of all. Born of meager heritage, his life reached rock bottom when he and his family were forced to live in the town jail because they could no longer afford the rent of their one room apartment. Experiences like these fueled Mucha’s ambition and fired his will to succeed throughout his life. Mucha left his home town of Moravia to study and produce art in Paris, where after several years he was discovered; instant fame and fortune soon followed. Having struck gold, Mucha no longer wanted for anything. Expensive clothing, the very best art supplies, beautifully exotic women, rich food and drink - everything was his. Mucha's fame exploded throughout France and soon spread to other countries in Europe. Though Mucha had been living in Paris for many years at this point, he still considered his homeland of Moravia to be something special in his life. Yet when the people of Moravia received news of Mucha's excessive wealth, they were disappointed with the artist for so
quickly forgetting his people and his own poverty-stricken history. They did not view Alphonse Mucha as a person who loved his country, but as a disappointment - a man who sold his soul for fame and fortune in a foreign city. Though Mucha's celebrity status never waned in Paris, Mucha himself left France in order to share his talents with the country and the people he loved. He began work on a series of twenty paintings which he called the Slav Epic. These paintings show scenes from twenty prolific events in the Slavic people's history, not simply recording events but glorifying the history of his people through these images.


Author: Danielle Kuntz
Faculty Sponsor: Matt Baumer

As contemporary worship services have become more popular in the last three decades, the use of traditional services has likewise decreased. This is an important change for instruments which are highly used in traditional services, such as the organ. Studies have already shown a drastic drop in the use of organs in large, contemporary services. Due to such movements, there has been a concern for the decline of organ use in general. The most resistant communities to contemporary services, and those still using the organ, seem to be smaller communities. To determine whether the organ is destined for extinction, this study will research its use in these smaller communities and also the congregational opinions of organ and church music. It is expected that though most congregations are resistant to the change and enjoy organ music, they have in some ways adapted a more contemporary style of music.

22. "Questioning Identity"

Author: Rachel Debuque
Faculty Sponsor: Patricia Villalobos Echeverria

One's personal roots, significance, and experience comprise our sense of self. Amid today's mass media created archetypes and idealized personas, we have become molded by what we see. I have scrutinized my own sense of self, trying to shed the layers created through persuasions of identity ideals. I address my femininity through a filter. As a female, it can be complicated to decipher the distinction between what is true identity and what has been compromised by outside pressures. Despite obstacles, I search for personal honesty. What roles do I play and how can I redefine them? I do not expect complete answers, but I do see these exercises as vital in a universal struggle. I express this exploration through photography, found objects, and other extended media. Through these means I wish to reach a larger audience, so that they too will question social norms and examine their conditioning.
23. "The Lens of Science: A Visual Exploration"

*Author:* Aimee Manion  
*Faculty Sponsor:* Patricia Villalobos Echeverria

The "lens of science" translates every detail of the world into an information code - digitized and organized according to the framework of rationality. At the same time, science reveals many things around us that are uncertain, ineffable, chaotic, fluid, and full of energy. This new paradigm is altering the way we live and the way we see the world. My work integrates the scientific lens with my own creative processes and discoveries. In this way, I am exploring the connections between art, play, information, and discovery. I seek to visualize the uncertainties of science in order to reveal how they contribute to a new way of seeing and understanding the world.

24. "The Medieval Musician Carvings in Beverley Minster: Fact or Fiction?"

*Author:* Aletha Greathouse  
*Faculty Sponsor:* Matt Baumer

Beverley Minster located in Beverley, England is a Parish church dedicated to St. John, St. Martin and the diocese of York. The dates of Beverley Minster range back to the 8th century when St. John of Beverley founded the Christian settlement. He retired from his monastery in 718, after his appointment as Bishop of York. After St. John's death the church became a place of pilgrimage, which drew King Athelstan to it in the year 937. As a thanksgiving for victory in battle he converted the monastery into a college of Secular Canons, endowed it handsomely and granted the church the Right of Sanctuary. By this time Beverley was the tenth town in the kingdom (England) and such is noticeable by the size and richness of the church. Leading well into the 13th & 14th centuries Beverley was the center of secular music in England. This is evident by over 70 medieval minstrel carvings located around the church. These are believed to be the largest collection of carvings of medieval instruments in the world, dating back to around the 13th & 14th centuries. As such, they offer significant evidence regarding the construction and use of Medieval instruments. It is important when looking at material from churches to remember that no church is ever finished; Beverley Minster is no exception to the rule. Improvements are made, repairs are carried out and wholesale restoration takes place. In the late 19th century John Percy Baker and his son undertook restorations of the carvings in the north aisle, because they were in reach of the hands of the curious and the hammers. While a contemporary of Baker's stated that these two gentlemen were "exceptional in this regard, for their careful study and obvious affection and respect for the original carvings are revealed in almost all their works," further study reveals that they made changes to the carvings that significantly altered the physiognomy of some of the instruments. In this paper I will take a virtual trip around the north aisle of Beverley Minster to explore which carvings were originals, which were restorations and what we can learn from these carvings.
in terms of instruments, environment (why Beverley?) and technique. Through this study I will also consider the value of the carvings as historical documents for both the Medieval period and the 19th century.

25. "The Spoils of San Marco"

Author: Joanna Martinec  
Faculty Sponsor: Irene Kabala

The Fourth Crusade had an immense impact on Venice and its art program at San Marco. After the Fourth Crusade in 1204, spoils were brought back to Venice from Constantinople. Included among the spoils were four bronze horses and a porphyry sculpture of the Tetrarchs. Both sets of objects had a venerable history. The bronze horses were first brought to Rome by the Emperor Nero and three hundred years later were taken to Constantinople. There they stood in the Hippodrome where they presided over the games. The Roman Emperor would address the crowds while standing between the horses. The porphyry statues came from the Philadelphion in Constantinople. These artifacts were imbedded in the very heart of Venice, the Basilica of San Marco. The bronze horses were placed on the West facade of San Marco overlooking the Piazza. The Porphyry sculptures of the Tetrarchs were set on the corner of the Tesero on the south side of San Marco. Their central location evoked political and religious ideas for the Venetians and legends arose about their origin and meaning. However, these legends varied and excluded any details of the Conquest of Constantinople. Instead, the Bronze Horses represented the Lord's Quadriga, the chariot of Apollo the Sun god and the power of the Byzantine emperors, whom the doges of Venice hoped to emulate. The Porphyry statues also functioned as ties to Rome.

26. "Wassily Kandinsky: Twice Foreign"

Author: Amanda Heath  
Faculty Sponsor: Brenda Mitchell

Wassily Kandinsky was born in Moscow, Russia in 1866. Kandinsky became one of the first completely non-objective painters, but he began his career in law before he transitioned into the world of art. Kandinsky left law and Russia in 1896, and he moved to Munich, Germany and studied painting. Although he volunteered to leave Russia, the existing social unrest, poor living conditions, and censorship set by an inconsistent government was not inviting to the creativity and innovative work that Kandinsky wished to pursue. A member of the Russian Orthodox faith, Kandinsky kept this faith throughout his life, and he integrated other aspects of his Russian heritage into his work. Russian folk art, Christian mythology, and music were key influences in the development of his painting and theories. In addition to this, the Theosophical movement became a major source of
inspiration for Kandinsky's non-objective work that rejected materialism and pushed for spiritual truth. A foreigner in Germany, Kandinsky was alienated from most of society, by personal choice, on more than one level. His alienation, however, proved positive in the successful creation of major theories and ideologies related to the spiritual in art.

Permanences

27. "Hand Drumming: A guide to the Djembe"

Author: Richard Bono
Faculty Sponsor: Michael Kingan

This session is a guide to the basic art of Djembe drumming. Materials covered in the session include the origin of the instrument, technique used to play the drum, construction, tuning, and other areas of interest. Also covered in the session will be rhythmic patterns and uses in modern ensembles.

28. "History of The Spiritual and the Solo Voice"

Author: Anqwenique Wingfield
Faculty Sponsor: Lorraine Wilson

According to Tilford Brooks, "Perhaps it is of some importance to clarify and define the kinds of songs that are included in that large body of Black religious music commonly referred to as "spirituals." " Three types of songs are usually included in this corpus of religious music, these being known as spirituals, jubilees, and shouts, though it is often difficult to distinguish one from another with any degree of precision." "Black religious songs that possessed a lyrical quality and expresses a wide range of emotions such as elation, hope, and sorrow, were called spirituals. The term "spiritual" was used because of the relationship between this type of song and the "holy Spirit." The jubilee was often an exuberant song that was said to come from the heart of the individual as opposed to the "holy spirit," causing him to sing to God of his happiness. The shout could be either of the other forms, when it was used as a dance song." This presentation will be a chronology of the spirituals and the solo voice in African American History.
29. "IUP Saxophone Quartet"

Authors: Justin Canzano, Mitchell Custer, William Gillespie, and Justin Polyblank  
Faculty Sponsor: Keith Young

The IUP Saxophone Quartet is made up of four sophomore and junior music majors. These students have been together as a saxophone quartet for two years and have performed several times on campus, as well as off campus for the Pennsylvania Music Educators Association District III Jazz Festival and the prestigious U.S. Navy Band International Saxophone Symposium at George Mason University in Fairfax, Va. The group performs a wide variety of styles including jazz, contemporary and classical literature arranged for four saxophones. For this performance the quartet proposes playing an extremely challenging work titled "Drastic Measures" by the living composer Russell Peck. This work is unique because it includes contemporary techniques of composition mixed with jazz styles of the 20th Century. It even includes a "blues" which is the most common style of jazz music - dating back to the beginning of jazz in New Orleans. The quartet could demonstrate some of these stylistic aspects and briefly discuss the research and study of all styles of music, which is required of musicians to perform this music correctly. It should inspire some interesting questions also. The piece is approximately 15 minutes in length.
30. "City Slick and Country Ice: Rural versus Urban Differences in Availability of and Attitudes toward the use of Methamphetamine Treatment Programs"

Author: Belinda Early
Faculty Sponsor: J Mabry

Methamphetamine (meth) is a problem in America, not just in urban areas. There is growing evidence of the problem in rural areas (Provet, 2005). This study seeks to understand how to more effectively get treatment to meth users in rural areas. Although treatment for meth use is widely available in urban areas, this may not be the case in rural settings. Further, just making treatment available may not be enough to help rural meth users (Warner and Leukefeld, 2001). Differences between country and city dwellers in their attitudes regarding the use of drug treatment may also be an important factor in developing effective drug treatment in each setting. Therefore, the purpose of this research is to examine rural versus urban differences in the availability of treatment programs and in attitudes toward the use of these programs.


Author: Nana Assabill
Faculty Sponsor: Jodell Kuzneski

Hospice means a place to live as fully and comfortable as possible. Management of symptoms related to the end-of-life (EOL) is an essential part of helping patients die comfortable and with dignity. Research has shown that EOL patients develop sudden symptoms and are "terminally transferred" to Emergency Departments unnecessarily. Emergency Kits such as the Comfort Care Kit have been developed by pharmaceutical companies through research and expert opinions to help hospices nurses to manage sudden symptoms pharmacologically. This research will look at the effectiveness and hospice nurses satisfaction of the use of the Comfort Care Kit by the Family Hospice of Indiana County. Data will be collected by review of medication disposal forms after patients die and survey of hospice nurses.
32. "Fast Food Nation (kentucky fried chicken)"

Author: Shakeisha Lewis

Faculty Sponsor: Portia Diaz

The topic that I researched was for Kentucky Fried Chicken. During my research, I had to search the topic, who is the founder? The most important part of my topic that I had to find out was the founder of KFC, who was Col. Harland Sanders. KFC was mainly for fried chicken. At the beginning of the Great Depression, Harland Sanders came up with the idea of getting a chicken restaurant. The first person who took him up on the offer was a man named Pete Harman in South Salt Lake, Utah. That's when they opened their first Kentucky Fried Chicken outlet in 1952.

33. "Food Consumption Trends Related to Health and the Fast Food Industry"

Authors: Olumayowa Azeez and Joshua Moss

Faculty Sponsor: Harold Donley

The purpose of this study was to investigate food consumption data for the United States and examine, using regression analysis, the linear or exponential trends of the various foods. This study specifically focused on foods commonly used by the fast food industry, beef, chicken, potatoes, etc., given the high volume of food used by fast food restaurants and the recent concern over the quality of food served at these restaurants. This study used the food disappearance data regularly published by the United States Department of Agriculture (USDA). This study examines the relationships between these and other foods and a separate class of demographic variables that may explain the trends shown by consumption data of certain foods. For example, average yearly income, cost of the particular food, and perceived healthiness of the food are examined and compared with food consumption data.

34. "If You Can't Take the Heat... Get Off the Field: An Understanding of the Risks Associated with Exertion Related Heat Illness"

Author: Chardae Bowe

Faculty Sponsor: Jose Rivera

A variety of studies have illustrated that the extent to which heat-related illness affecting athletes is varied depending upon the level of acclimatization, hydration, cardiovascular fitness, percentage of body fat, and performance intensity. Extrinsic factors include ambient temperature and humidity. The increase in knowledge of this form of illness has grown by leaps and bounds, however in the news there is a story nearly every August about the deaths related to heat stroke during football training camps. This study proposes to assess the knowledge of risk concerning the primary culprits and prevention of exertion and heat
related illness among local collegiate and high school football athletes. Its purpose is to broaden education in the sphere of sports medicine by equipping athletes with a better understanding of the importance of fluid replacement and knowing the early stages of heat related illness. A survey distribution among Indiana University of Pennsylvania and Indiana High School football participants will be used as a tool for analysis in this research.

35. "Out of Shape?: An Evaluation of the Pennsylvania State Health Improvement Plan's Community Partnerships and Major Health Issues facing Urban & Rural Areas."

Author: Timothy Gleave  
Faculty Sponsor: Harvey Holtz  
In recent years, public health issues have become more important in the field of health. The Department of Health and Human Services adopted their 3rd version of the Healthy People program, named Healthy People 2010. Pennsylvania has also adopted the State Health Improvement Plan, which focuses on local community partnerships. Healthy People 2010 and the State Health Improvement Plan have set ultimate goals of eliminating health disparities and increasing the quality and years of healthy life. The programs are using the ideas of community partnerships to address health issues at the local community level. The purpose of this program evaluation is to determine whether communities that are in urban settings are better suited than rural counties to address their major public health issues.

36. "Taco Bell"

Author: Trista Schreckengost  
Faculty Sponsor: Portia Diaz  
The question that I decided to research from the main topic was the Positive and negative publicities of Taco Bell. The first of the paragraphs will be on the first source, in which is about a negative view of the restaurant. The next few paragraphs after that will contain information from the American Bar Association Journal. Following that I will give some information of some articles that the Advertising Age that have showed some of the negative and positive publicities of Taco Bell. The last couple paragraphs will have information from the Fast Food Nation book and also the Taco Bell website itself.
Posters

37. "Community Reentry after Imprisonment: Roadblocks?"

Authors: Derek De Carlo, Jordan Haring, Markie Ponsonby, and Jason Richards
Faculty Sponsor: Rosemary Gido
With hundreds of thousands of individuals being released from state, federal, and local prisons each year, a key term in criminology today is "community reentry." This poster presents recommendations to better transition the offender back into the community. These include: transition housing, family reintegration and support, employment training and access, treatment. These solutions need more study and should address issues of stigma, voting rights, and improved parole services.

38. "Community Re-Entry After Imprisonment: What Are the Roadblocks?"

Author: Derek Scheer
Faculty Sponsor: Rosemary Gido
Individuals leaving prison or jail today face many roadblocks to community re-entry and reintegration. This poster focuses on in-prison programming to support rehabilitation and community re-entry. Research on programs that emphasize work training, employment, and family reuniting will be presented.

39. "Correlations involving college females and eating disorders"

Authors: Stephanie Bobby and Heidi Mitskavich
Faculty Sponsor: Michele Gerwick
There is a problem of eating disorders and the physical, social, and psychological well being of college women. There is an increasing incidence of eating disorders among college women and has been linked to the causes of the media, inability to cope (poor coping mechanisms), social interaction, stress, ideal standards of body image, and adaptation to college life (Kitsantas et al., 2003; Abood & Black, 2000; Allison & Park, 2004; Reinking & Alexander, 2005). All reasons why this problem is occurring seem to be linked to one another. With the increase of this "hidden" disease on college campuses, "Researchers have begun to focus on specific aspects of the college environment that may encourage/facilitate these behaviors (Allison & Park, 2004)."
The purpose of this research utilization project is to identify which environmental factors and behaviors enable female college students to continue an already existing eating
disorder, education encouragement on the disease and how to identify it, methods to prevent eating disorders from controlling another female college student's lives, and to treat those who already suffer.

Four valid, reliable, and scholarly reviewed articles were chosen to analyze utilizing the Stetler model of college females in various activities during their college career. Inclusions for all articles are females enrolled in a college. While analyzing, it was taken into consideration the method used in all four research articles was non-probability sampling in order to find a correlation to find new methods of preventing and treating this disease. The articles were compared with results reviewed.

There is no relation between sorority girls and eating disorders and non-sorority girls and eating disorders. The sorority girls experienced a weight gain larger than that of non-sorority girls (Kelly & Park, 2003). Participation of female students in athletics presents a ninety-six percent positive correlation with educational interventions causing a higher self-esteem (Abood & Black, 1998). A correlation exists between college females and life satisfaction, positive/negative affect, and self-regulation. Those who have a better outlook on life in general, have a better chance to regulate their actions and have a lesser chance of suffering from an eating disorder (Kitsantas et al., 2003).

Education and recognition for prevention of this disease needs to be implemented. Intervention is seen as needed for all college females, especially athletes. By educating, preventing, and/or treating this hidden disease, as those who are suffering tend to not exploit their disease, the numbers of occurrence will greatly decrease.

40. "Drug Courts: Do They Work?"

Authors: Dylan Borland, Richard Brutt, Andrea Kessler, and Jeffrey Warnock
Faculty Sponsor: Rosemary Gido

Given the high rate of local, state, and national jail and prison overcrowding, drug courts have been established across the U.S. as an alternative to a jail/prison sentence. The poster researches the evidence on the effectiveness of these courts in reducing crowding, recidivism, and drug relapse.

41. "Drugs: The Truth about Pennsylvania"

Authors: Joseph Priolo and Jason Salm
Faculty Sponsor: Rosemary Gido

The poster presents the harsh reality regarding illegal drug use in the Commonwealth. Cities like Philadelphia and Pittsburgh have encountered high rates of violence, with heroin drug activity. Even rural areas now experience 'drug trafficking'--with crack, meth., and other drugs in wide supply. PA's prisons and jails are overcrowding directly related to the incarceration of drug offenders.
42. "End-of-Life Care for Parents of the Neonatal Intensive Care Unit"

Authors: Amanda Harrison, Kara Smail, and Courtney Tims

Faculty Sponsor: Jodell Kuzneski

The problem that was researched was the inadequate training of nurses to support the parents during the bereavement period before and after the loss of their infant. The incidence of this problem depends on different factors such as geographical area, hospital staff and policy, and the prenatal care that the mother received while she was pregnant. The major significance of this problem to nursing is providing the parents or guardians with information and support to help comfort them during their time of need.

The purpose of the research utilization (RU) team is the application of available knowledge to improve patient outcomes. RU also helps fill the gap between research and clinical practice. RU encourages the use of evidence-based practice, which discourages health-care professionals from centering their practice on tradition or experience but on scientific research findings. Evidence based practice is gradually starting to fill the void between research and clinical practice. The RU team selected and critiqued three research articles regarding end-of-life care and bereavement in the neonatal intensive care unit. These articles included "Neonatal Staff and Advanced Practice Nurses’ Perceptions of Bereavement/End-of-Life Care of Families of Critically Ill and/or Dying Infants" in the American Journal of Critical Care in 2004; "Life Support Decisions involving Imperiled Infants" in the Journal of Perinatal and Neonatal Nursing in 2000; "Bereavement Support for Couples following the Death of a Baby; Program Development and 14-year Exit Analysis" in the Death Studies Journal in 2002. The RU team concluded that each study had scientific merit and, therefore recommends further education is needed in end-of-life care and bereavement support for all levels of nursing.

43. "Evolution of Juvenile Corrections"

Authors: Justin Calistin and Frank Scatena

Faculty Sponsor: Rosemary Gido

The origin of juvenile imprisonment dates back to the original House of Refuge. The poster investigates what are current practices in juvenile incarceration and justice--family mediation and balanced and restorative justice practices.
44. "Failure Mode Effect Analysis on a boiler"

Authors: Nicole Buczak, Joanna Cornell, John Montgomery, and Dustin Schoffler

Faculty Sponsor: David Rhodes

A safety science project was completed at the co-generation plant on the campus of Indiana University. A Failure Mode Effect Analysis (FMEA) of a Johnston fire tube boiler was conducted. A FMEA determines what can go wrong with each individual piece of the system and what effects each failure can have. It also evaluates reliability and identifies single point failures with a given system. This entailed a walk through of the Plant itself, and a detailed view of the perimeter around the boiler. During the analysis it was found that the boiler was reliable, if installed and maintained properly. A review of the maintenance and operating system should be conducted with emphasis on the key components. Aiding the FMEA, a Preliminary Hazard List (PHL) and a Preliminary Hazard Assessment (PHA) should be conducted to identify possible system failures. To aid in the PHA, a precise matrix was used to evaluate the severity and probability of the hazardous event. Once the counter measures were developed a new risk assessment was conducted. All of these tasks were completed with the help of our resources along with the knowledge of our system safety working group.

45. "Inside Mandatory Minimum Laws"

Authors: Timothy Brady, Joseph Buhler, and Maddie Ursitz

Faculty Sponsor: Rosemary Gido

The passage of mandatory minimum punishment laws by state legislators and U.S. Congress for drug and violent offenses has raised major issues regarding judicial discretion, prison overcrowding, and constitutional rights. Mandatory minimum drugs laws, in particular, have impacted women and people of color.

46. "Playing for Keeps: An Examination of the Fit of New Graduate Nurse Orientation Programs to the Needs of Graduating Baccalaureate Seniors"

Author: Jessica DeSalvo

Faculty Sponsor: Jodell Kuzneski

The number of individuals currently employed in the nursing profession is far below the number projected as ideal. This nursing shortage is well documented in the scholarly literature and has been addressed in a number of ways by the health care industry. One intervention has been the implementation of costly orientation programs for new graduate registered nurses in the hospital setting. Despite this action, many new graduates continue to report dissatisfaction upon entry into practice and consequently leave the position or the field altogether. This study utilizes a questionnaire to explore the emotional concerns and
technical skill challenges professed by senior nursing students at the Indiana University of Pennsylvania who anticipate graduation within one year, as well as the perceptions of these individuals regarding the effectiveness of actual and potential strategies employed within hospital orientation programs. Examination of the data is intended to facilitate the development of new graduate nurse orientation programs that are maximally beneficial to both new nurses and the hospitals that employ them.

47. "Pregnancy Prevention in Adolescents"

Authors: Danelle Claar and Lacey Laney
Faculty Sponsor: Michele Gerwick

Background: The background for this clinical problem is the fact that countless interventions have been set up to help adolescents, yet teenage pregnancy is still occurring and continues to pose many problems. Objective: The purpose of our research utilization project was to identify and evaluate strategies being conducted with pregnant teens. It is vital to discuss ways of preventing teenage pregnancy. This is a concern to parents, peers and the family members of all adolescents around the world. Methods: Four quantitative articles were critiques and reviewed utilizing the Stetler model. These articles discussed interventions and surveys conducted with adolescents ages 12-20 years. These adolescents were asked questions about things such as sex, STDs, pregnancy and the prevention of pregnancy. Results: The results of the surveys showed that an increase in knowledge may prove to be the valuable key in prevention of adolescent pregnancy and STDs. Conclusion: Teenage pregnancy is an ongoing health concern in the United States and the World as well. With the help of schools, clinics, and hospitals, the word can be spread to prevent such occurrences. It is the nurse's responsibility to be an advocate of health care to children, adolescents and individuals of all ages. Nurses can make a positive difference one life at a time.

48. "SCI Pine Grove"

Authors: Anna Fyock and Amanda Marshall
Faculty Sponsor: Rosemary Gido

SCI Pine Grove in Indiana, PA is a prison for youth—legally. juveniles who have been "waived" from juvenile court. Tried in adult courts for their crimes, they are sentenced to serve part or all of their time in this state prison. The poster focuses on the therapeutic community and other programs in this facility designed to help these young men adjust to prison life.
49. "Supermax Prisons in the United States"

Authors: Melissa Barry, Omari Jackson, Samantha Jones, Amber Noel, and Matthew Thomas

Faculty Sponsor: Rosemary Gido

Supermax prisons have become a key part of the U.S. state and federal incarceration system. Designed to hold "the worse of the worse," these prisons raise important issues about solitary confinement and its effects, violence in prison, and civil rights of inmates.

50. "The Basics of Electronic Monitoring"

Authors: Daniel Gudelsky and Kevin Rusin

Faculty Sponsor: Rosemary Gido

One response to local prison overcrowding has been the imposition of electronic monitoring sentences, where offenders serve their time monitoring by increasingly sophisticated leg "bracelets," voice recognition systems, and satellite (GPS) tracking. The poster addressed the effectiveness of these devices and their impact on prison and jail overcrowding.

51. "The Causes and Effects of Prison Overcrowding"

Authors: Zachary Edwards and Jared Janocha

Faculty Sponsor: Rosemary Gido

The United States leads all democratic countries in the rate at which we incarcerate people. State prisons have become overcrowded, a result of the War on Drugs and mandatory minimum laws' passage. The poster examines the reasons for overcrowding and some impacts—the constitutional issue, in particular, of whether overcrowding means "cruel and unusual" punishment for those in prison under these conditions.

52. "The Need for End-of-Life Care Protocol In The ICU"

Authors: Ashlee Bennett and Stephanie Dalnekoff

Faculty Sponsor: Jodell Kuzneski

Nurses, especially critical care nurses are taught to save lives. It is not typical [kosher] for critical care staff to accept the passage of death without first acting on every possible intervention. This ideology is found to be a barrier to the transitioning from critical care to palliative (or end-of-life care) in the intensive care unit (ICU). The research utilization (RU) Team has discovered a deficit in the actual transition from acute critical intervention to
palliative care in the ICU. There is also a lack protocol set forth to initiate the actual transition of such care. A discrepancy in prompt establishment of advance directives upon hospital admission is also a hindrance to transitioning in care. The team focused on a population consisting of terminally ill, intensive care unit patients with poor prognoses. The population is not specified to a specific gender or diagnosis except those labeled as "terminal". The patients are also palliative care candidates. Palliative care is health care aimed at symptom management, rather than curative treatment for diseases that no longer respond to treatment (Lewis, 2002). It is especially the responsibility of a nurse, who is deemed the "patient advocate" (Kozier & Erb, 2004) to ensure that the patients' care is based on their decisions and not that of the healthcare team. In nursing there is a great need for evidence based practice, or practicing techniques that are supported by scientific research. Nurse researchers, conduct research to find the most appropriate answers to treatment needs and also strive to improve basic patient care. After evaluation of twelve research articles, the research utilization team chose four articles that were most relevant to their research problem for critique. All of the articles were scrutinized and thoroughly critiqued and found to have scientific merit. The critiques and findings were compiled to develop a recommendation for further research on this topic. The research utilization team also recommended the development of protocols specifically aimed at facilitating transition from critical care intervention to palliative care for patients with poor prognosis in the ICU.

53. "The Use of Illegal/Legal Guns in the Progress of a Crime"
   
   Author: Alex Suppa
   
   Faculty Sponsor: John Benhart
   
   Looking at the correlation of illegal guns used in the progress of committing a crime in relationship to heavily populated areas and close proximity to major interstates compared to legal guns and their distribution in less heavily dense population and unlikelihood of use in a crime using data from the UCR and the USA census.

54. "The War on Drugs: Crack--How it Affects the Community"

   Authors: Daniel Brasington, Shane Connelly, and Thomas Scalzitti
   
   Faculty Sponsor: Rosemary Gido
   
   Since the 1980's, the U.S. War on Drugs has focused on crack cocaine, resulting in a disproportionate impact on minorities and people of color. The poster will cover the history of the War on Drugs and crack and its effects on society--poverty, violence, increased incarceration rates, families, and the criminal justice system.
55. "Utilization of the Stetler Model in Research Utilization to Determine the Best Method of Reducing Nosocomial Infections"

Authors: Annale Chieffe and Sarah Smith
Faculty Sponsor: Michele Gerwick

The purpose of this research utilization project was to research the topic of handwashing versus alcohol-based hand sanitizers due to the rising nosocomial infections in hospitals each year. This research project was completed to determine if there was a more effective method for decreasing these infections rather than just with handwashing. This research is based on finding which method of hand sanitizing works best at killing microorganisms. By finding the method that kills the microorganisms the most, we can then use this specific method more in the hospital setting in hopes of decreasing nosocomial infections.

The articles used were identified from EBSCOhost. Four quantitative articles were selected on handwashing and alcohol-based hand sanitizers in hospital-based units. The articles were read and critiqued by utilizing the Stetler model and then conclusions were developed from the research findings.

Through the use of this model, we learned that hand sanitizers are more effective at killing microorganisms than handwashing with soap and water, and health care professions are more inclined to use the hand sanitizers, rather than actually washing their hands.

By substituting handwashing with use of alcohol-based hand sanitizers, health care providers can decrease transmission of microorganisms. The chance of compliance to this method is greater due to its ease and quickness, rather than spending the time to wash hands properly. A change as small as this can have such a huge effect of improving the health care the patients receive and decreasing the amount of time they spend in the hospital.

The importance of this research utilization project was to determine how to benefit nursing altogether by improving the health care in all hospital settings by reducing the amount of nosocomial infections.

56. "Weather and Performance at the Laurel Highlands Ultra"

Author: Daniel Staschiak
Faculty Sponsor: Linda Klingaman

Effects of weather conditions on running performances are well documented, especially in marathons and shorter distances. The purpose of the present study is to determine the extent to which weather conditions affect the performances of runners in the Laurel Highlands Ultra, a 70.5-mile point-to-point trail race in southwestern Pennsylvania. Finisher ratios and checkpoint times were collected from the Laurel Ultra website for all runners who finished under the cut-off time for 2001 to 2006. Multiple weather conditions were recorded from several online weather history sites. None of the selected weather conditions were highly correlated to overall finish times. However, dew point and visibility were found to have a very high relationship to the winning time. In addition, dew point was found to have a very high relationship to finisher ratio. The basic application remains unchanged: weather will not make up for a lack of proper training. Ultramarathoners can expect weather conditions
to somewhat affect their performances but need to better train for the race to achieve better results, observe their fluid and electrolyte balance, and prepare for anything to happen between the start and finish line. Data including plasma and sweat ion concentrations and effects of thermoregulatory mechanisms during fatigued running may provide further insight into weather and ultramarathon performance research.

Author: Robyn Markowitz
Faculty Sponsor: Melanie Hildebrandt

Using survey data and secondary sources, this paper discusses how Jews have assimilated into American culture. The literature asserts that most Conservative Jews feel that being Jewish is a distinct racial identity, whereas Reform Jews view it as simply a religion. I will present the results of an on-line survey of over 30 respondents from different branches of Judaism to test this theory.

58. "Archaeology and the Bible: A Review of the Current Debate"

Author: A. Skye Flynn
Faculty Sponsor: Miriam Chaiken

The Biblical story of the United Monarchy of David and Solomon and the following period of the Divided Kingdoms of Israel and Judah falls within a 400 year period which is currently a hotly debated topic in the field of Levantine archaeology. This presentation will review these arguments and discuss the ramifications of each for our understanding of the Biblical narrative.

59. "Capitalism & the Herd"

Author: Tommy Hanauer
Faculty Sponsor: Robert Heasley

What is the impact of capitalism on sexuality? Capitalism has turned sexuality, and subsequently, humanity itself into a commodity. All social discourse on sexuality is built around heteronormativity, or the promotion and normalization of heterosexuality, which relies on both the state for its regulation and capitalism for its continued expression, enforcement and reproduction. Heterosexuality represents the ideal model of human conduct that capitalism promotes. It is a sexuality that is consumed, and one that relies on materialism for its expression. It is also a sexuality that is molded around ritual (marriage, dating) that relies on and requires the use of capital, and state regulation that rewards those who adhere to its practice in forms such as marriage benefits, and withholds benefits in the form of status and resources, from those who do not. Why is this? Heterosexuality provides
capitalism with its life's-blood: producers and consumers. Heterosexuality is regulated so it provides capitalism with labor in the factories and consumers of the products that these factories produce. The capitalistic endeavor to normalize and promote the heterosexual ideal has led to many cultural practices, some of which are encoded in law, about dating, marriage, birth, promiscuity, and virtually all interaction between human beings, so they may all work for the same goal - to benefit and keep capitalism in power. Heterosexuality doesn't just exist as a "natural" instinct and form of expression, it exists as a commodity, highly regulated, manipulated and controlled. This paper provides a functionalist and Marxist perspective on capitalism in relation to hegemonic heterosexuality and utilizes the theories of Chris Ingraham and Michel Foucault to analyze the problem that is facing us, namely the transformation of our sexuality into capitalistic machines that both produce and consume.

60. "Christian Existence"

**Author:** Christine Marie  
**Faculty Sponsor:** Ray Beisel  
Working on the idea of Christian god being solely male because human beings represent the female entity, thus Jesus had to come from the female entity (human) however, my flaw is how many equals one, and can one exist without the other. No single human being would be a human being even in their perception without another human being, nor would any other animal. So, if we don't acknowledge, does it exist, and also, if we ourselves are not acknowledged...do we exist? how did one come to be if the other didn't make it...was it all mass and material in the first place shoved together in a colossal blast and both ends picked and pulled at each other. Clearly if we are looking at God/Goddess humans as female/male entities we are the weaker sex, by only our confession are we not as powerful...well maybe not as one but as many, which is where the rule of three comes in with Christian deities. God/Jesus/Holy Spirit. One of them singular cannot be as all-powerful as let on. Neither can a singular person. 1 and 1 equal three which is the perfect number so three should be it? However it is a different weight ratio. All of these are answered in great detail in the paper, and are correlated well.

61. "Citizens and Barbarians: Racism in Ancient Rome"

**Author:** Anna Watson  
**Faculty Sponsor:** Francis Allard  
The act of judging another human based solely on their appearance is strongly condemned in our society, yet such discrimination has proven to be difficult to destroy. Did western society invent racism, or have we merely inherited this disturbing tradition from our ancient ancestors? The Roman Empire encompassed regions containing people of widely varying appearance, many of whom held the title of citizen, a concept which crossed geographic
and cultural boundaries. Using ancient Rome as the primary case study, this project will address the implications of citizenship and its effect on the prejudicial perception of appearance.

62. "Factors in Underemployment in Rural Pennsylvania"

**Author:** Carrie Hall  
**Faculty Sponsor:** James Jozefowicz

Unemployment is a problem for rural Pennsylvania, but underemployment is equally important. Using survey data taken by the Center for Rural Pennsylvania, econometric tests were performed to identify factors highly associated with self-reported underemployment. Being female and/or having less than a high school diploma are highly associated with self-reported underemployment.

63. "Frequency and Intensity of Post-relationship Grief in University Students"

**Author:** Craig Morris  
**Faculty Sponsor:** Miriam Chaiken

If we accept love as a human universal, then we assume some form of romantic bonding is equally cross-cultural. Assuming that some relationships will fail, it follows that the aftermath of that failure is an experience many would suffer. This study shows that the associated suite of behaviors (post-relationship grief, or PRG), is more frequent, intense, and widespread than conventional wisdom suggests. Why did PRG evolve as a response pattern? How is it transmitted? Does PRG vary by age or gender? Is intensity related to who initiated the breakup? Furthermore, what adaptive benefit does this trauma confer? If PRG is a biologic universal, how do we amalgamate it with one of evolutionary psychology's boldest claims: that men and women have conflicting goals in relationships? That being the case, then theoretically, the physical and emotional trauma at a relationship's end should be disparate as well. For purposes of this study, one specific question was addressed: are there quantifiable gender differences in frequency, intensity, and expression of PRG? To address this query, data was collected from 1433 university students. Their reported frequency of PRG was high: 91% of males and 93% of females reported at least one breakup. Additionally, intensity and expression of emotional and physical trauma were also elevated: emotional trauma was experienced by 99% of all respondents, while physical trauma was experienced by 68% of males and 78% of females. Significantly, the results suggest that there is no observable trend of variation in PRG frequency and intensity between genders.
64. "Income Inequality and Educational Attainment Rates: The New York Story"

Author: Ali Cannoni  
Faculty Sponsor: Jim Jozefowicz

This paper examines the relationship between changes in income inequality and educational attainment rates in New York counties during the 1990s. The dependent variable is the change in the Gini coefficient over the decade. The independent variables include the Gini coefficient for 1990, educational attainment rates at the high school, bachelor's degree, and graduate/professional levels, the natural logarithm of population density in the county, and an index of racial diversity in the county in 1990. Results of OLS regressions suggest that county population density, and educational attainment rates at the bachelor's degree and graduate degree levels are associated with unfavorable changes in county income inequality over time. Alternatively, the initial level of income inequality and the high school attainment rate are associated with favorable changes in income inequality over time in New York counties.

65. "Is Zoning Working in the Borough of Indiana?"

Author: Joshua Reinard  
Faculty Sponsor: Robert Begg

Communities use zoning as a way to regulate the use of land and structures. Zoning ordinances are designed to protect the public health, safety, and welfare as well as to guide growth. This research will compare the property values in the borough of Indiana to surrounding White Township that does not have a zoning ordinance, and also the measures of externalities and zoning. This is called the hedonic housing price model, and is the most common way to analyze the effect of zoning regulations.


Author: Stephen Logan  
Faculty Sponsor: Joseph Mannard

Blackface minstrelsy arguably represents the birth of American Popular culture. Through the initial character of Jim Crow it also acted as symbolic imagery associated with institutionalized racial segregation. As the Civil Rights Movement emerged powerfully onto the stage after WWII the country experienced sweeping social and economic change. Individual communities throughout the country dealt with new laws and social doctrines in varying ways, and for communities such as West Chester, Pennsylvania (a town that considered itself a "friend of the black") complex emotions played out in the arena of local politics and community interaction. Starting in 1949 the Men's Brotherhood of Grove
Methodist Church (located five miles from West Chester, county seat of Chester County) employed a common fundraiser: the blackface minstrel show. By 1959, however, the performances ceased due to rising sentiments that they were "inappropriate." The performances offer a unique opportunity to study seemingly benign racism coupled with the advances of the Civil Rights Movement. The performances show the mainstream character of symbolic racism that developed across the country, and studying the historical context of them offers insight into the changing perceptions of culture in America.

67. "Roadblocks to Acceptance"

Author: Christopher Vaneczek

Faculty Sponsor: Robert Heasley

There is a growing body of evidence that being a man is bad for people's health. American men between the ages of sixteen to twenty-four commit most of the violent crime in America (Kimmel, 2006). This is in addition to America having the highest homicide rate of any industrial nation (Kimmel, 2006). Men also account for 93% of all road rage accidents (Kimmel, 2006). Rape on college campuses is also a major concern with 15%-20% of female college students reporting forced intercourse (Carr & VanDeuson, 2004). Men are four times more likely to take their own life and recent studies have suggested that male depression is more widespread then previously thought (Brooks, 2001). Alcoholism and drug abuse are also dominantly manly endeavors (Brooks, 2001). Finally homophobia is a real problem on college campuses intimidating men of all sexual orientations and leading to acts of violence (Dean, 1998). In response to these problems many programs and interventions have been created to help prevent these problems. These programs and interventions come in a variety of formats and topics from long term men's discussion groups to presentations addressing the role of men in sexual violence to sensitivity training. One thing that these programs have in common is their basis in some masculine theory, whether it be hegemonic masculinity, essentialist gender theory, behavioral norms theory or feminist theory. This theory informs how they try to influence males to promote certain types of behaviors. Yet these programs are often unevaluated and created at a theoretical level with no input from the men they are targeting. This mixed methods research project, which will be completed in February 2007, looks to change this lack of data about how men view interventions and how these interventions should look. Two hundred plus students, male and female, were surveyed in classes. Men who were willing to be interviewed were then placed in two different groups-those with mixed levels of homophobia, sexism, and non-acceptance of alternate forms of masculinity and those who had low levels of homophobia, sexism, and who are accepting of alternative forms of masculinity. These men will then interviewed, using a semi-structured format, about three main concepts: how they see programs that tried to change their perceptions of masculinities, what recommendations they would give to program designers, and what it would take for them personally to change their minds. These interviews will then be transcribed and analyzed.
68. "The Effects of Environmental Factors on Cancer Incidence Rates in a Sample of OECD Developed Countries"

*Author: Shannon Stare*

*Faculty Sponsor: Jim Jozefowicz*

The effects of environmental factors on international cancer incidence rates are analyzed empirically. Using data from 30 OECD developed countries for the year 2002, a regression equation is estimated using ordinary least squares (OLS). This study uses environmental factors that have been suggested by other studies to have significant effects on cancer risk. The dependent variable is cancer prevalence rates. Independent variables are lagged to account for the long latency period of cancer. The independent variables can be placed into four categories: air pollutants, nutrition, lifestyle, and water quality (all of which are considered to be environmental factors). The results indicate that carbon monoxide, fat intake per capita, and total alcohol consumption all have a statistically significant positive impact on cancer incidence rates while total fruit and vegetable consumption have a statistically significant negative impact on cancer incidence rates.

69. "The Evolution of Morgan le Fay"

*Author: Elise Auvil*

*Faculty Sponsor: John Marsden*

"The Evolution of Morgan le Fay" is a paper presenting the results of a research project in the area of Arthurian Literature. The character of Morgan le Fay is one of the most infamous and complex characters in the Arthurian legends. Early in the legends, Morgan was a divine, pagan mother goddess, but she slowly transformed into an evil sorceress set on the destruction of the Round Table. This research project presents an understanding as to why and how this transformation occurred.

70. "The Fall of Eve"

*Author: Elizabeth Knowlton*

*Faculty Sponsor: Theresa Smith*

The purpose of this paper was to look at how Judaism and Christianity interpret the Fall of Eve in Genesis. Those interpretations were then used to look at the current reactions of violence against women in each of those traditions respectively.
71. "The Iliad and the Middle East: Cultures Based on Shame"

Author: Margaret Stoneback  
Faculty Sponsor: Janet Goebel

Guilt and shame cultures are not modern phenomena confined to the Middle East; in fact, both cultures existed during the time of the Iliad. Guilt-based culture is based on a fundamental idea of right and wrong and guilt is interpreted through an individual point of view, such as the judge in the American legal system. However, a shame-based culture has nothing to do with right or wrong; instead, actions are judged on the basis of being honorable or dishonorable. Based primarily on social conduct interpreted within the greater community, shame-based cultures also have individual aspects that result from an individual's self-perception through society's eyes. A shame-based culture significantly changes the various interpretations of the Iliad, indeed, a shame-based culture changes the world's understanding of the Middle East as well, and the lessons learned from the Iliad have vast political and social implications. The Iliad and the Middle East: Cultures Based on Shame explores both guilt and shame-based cultures in depth, and also analyzes their implications in Homer's The Iliad and the Middle East.

72. "'They Rustle Like Leaves:' The Function of Repetition in the Affirmation of Identity in Samuel Beckett's Waiting For Godot"

Author: Leeann Comfort  
Faculty Sponsor: Mike Sell

Samuel Beckett's landmark drama Waiting for Godot has been described as a play in which "nothing happens-twice." Though the play contains lengthy dialogues and tense actions, the events offer neither a social nor an epistemological resolution to the dramatic crisis at hand--in other words, it fails as a drama. However, a study of the unique use of repetition within the play reveals the structure of this crisis, as well as the reason Vladimir and Estragon are unable to undergo any legitimizing change. By paying attention to how Waiting For Godot doesn't "work" as a drama, we can understand the importance of the individual's role in causing change as we search for a better personal and collective future.

73. "'What makes Sammy run?' : Using structuralism and Marxism to "do the right thing"

Author: Mary Sirianni  
Faculty Sponsor: Barbara Kraszewski

What makes a hero? Does it lie in personality and beliefs, or deeds and actions? When faced with a difficult choice, how does one react? Does the ideology go out the window or does one do the right thing? Spike Lee raises these questions in his 1989 film "Do The Right Thing" by depicting one hot day in Brooklyn where temperatures and racial tension
heat up. Which characters will be heroes and take steps to rectify an escalating situation of racism and economic struggle? Through structuralism and Marxism, one is able to determine which characters are most heroic, and who, if anyone, does the right thing.

74. "Women and Labor Organizing within the Coalfields of Depression-era Harlan County, Kentucky"

Author: Bobbie Zapor
Faculty Sponsor: Elizabeth Ricketts Marcus

While often overlooked, many women have played essential roles within the coal mining industry. By focusing on events within depression-era Harlan County, Kentucky, this presentation specifically explores the roles women have played in that industry’s labor organizing efforts. The study concludes that through varied organizing tactics, such as music, traveling, and fundraising, women proved to be important and active participators in an industry commonly associated with men.

75. "Women's Gain in the Military During World War II"

Author: Susan Pugh
Faculty Sponsor: Elizabeth Ricketts Marcus

Throughout World War II women struggled to make a place for themselves among the U.S. Military. They played an important role on the homefront and took over the role of man not just in the workforce, but also in the military at home. Women learned fighting skills, how to build and fly planes, and most of all learned respect for themselves and for other women, but through all their efforts women were still looked down upon and were mocked by fellow soldiers of the male gender. Only by understanding the people who opposed them and the people who believed in women joining the military can we understand the struggles that women went through to gain benefits and respect in the U.S. Military.

76. "Young Adult Decision Making: Male Relative Cohort Size and the Easterlin Hypothesis, 1959 - 2001"

Author: Christopher Krahe
Faculty Sponsor: James Jozefowicz

This paper studies the relationship between male relative cohort size and other economic and demographic variables as proposed by the Easterlin Hypothesis. Easterlinian theory suggests that relative cohort size is the driving force behind much of the decisions made by young adults. These decisions include fertility, college enrollment, and employment.
Relative cohort size is also expected to significantly influence female wages, male relative income, and the female unemployment rate. Through an indirect method, this study takes relative cohort size as the dependent variable and uses OLS to determine coefficients signs for fertility, female college enrollment, female employment, female income, male relative income, and the female unemployment rate. The sample consists of time series data for the United States from 1959 to 2001. Results generally support Easterlin's expected relationships between relative cohort size and the six independent variables.

**Posters**

77. "A Comparison of Lithic Assemblages from the Johnston and Carl Fleming"

*Authors: Erica Ausel, Stephen Brock, Ali Littman, and Samuel Williams*

*Faculty Sponsor: Beverly Chiarulli*

Students from Indiana University of Pennsylvania investigated the Carl Fleming site and the Johnston site during archaeological field school in 2004 and 2006. One of the most common types of artifacts recovered from both sites was lithic artifacts, including tools and debitage. Analysis of the lithics focused on the manufacturing sequences and types of raw material used at these two locations some 25 miles apart. Through this analysis, we have been able to compare the assemblages and tool making technologies.


*Author: Jessica Rich*

*Faculty Sponsor: Ruth Shirey*

In recent years, close elections have illuminated the importance of winning swing states. One swing state, Florida, was infamously close in the 2000 presidential election. During the 2004 election, Florida remained close, but the gap widened considerably. Utilizing GIS to analyze county voting patterns and relevant U.S. Census demographics, this report analyzes emerging patterns in Florida politics.

79. "A GIS Analysis of Flooding Hazards in Johnstown, Pennsylvania"

*Authors: Jessica Rich, John Davis, Gregory Kuckuck, and Kevin Vogt*

*Faculty Sponsor: John Benhart*

The purpose for our presentation pertaining to the Undergraduate Scholars Conference is working in conjunction with the John P. Murtha Institute for Homeland Security in order to assist emergency rescue operations in Johnstown Pennsylvania. Due to the historic nature
of floods in Johnstown, our focus will be on saving lives and protecting property through the availability of accurate and efficient use of Geographic Information Systems generated by GIS applications.

80. "A GIS Diffusion Pattern Analysis of Sea Lampreys in the Great Lakes Region"

Author: John Davis  
Faculty Sponsor: Ruth Shirey

Sea Lampreys are an invasive species located in the Great Lakes region of North America. The focus will be the diffusion patterns and locations of the parasite in the lakes since they were introduced into the region some decades ago. This data collection and analysis will be produced through efficient use of Geographic Information System applications. Another concentration of the project is the factors that decide where the lamprey is present, such as if they prefer warm or cold temperature related areas and if their food supply favors a certain type of fish. Finally, I will investigate how humans have attempted to control and decrease the population of the sea lampreys from the lakes.

81. "An Unknown Species Within Pennsylvania's Forest"

Author: Jonathan Gallardy  
Faculty Sponsor: Ruth Shirey

The Pennsylvania fisher's habit and ecology has been unknown to wildlife researchers since they have been reintroduced in 1994. A study was set up to answer questions about this predator. With the use of telemetry data that was gathered from the radio collared fisher and the use of GIS indicating land cover and land types, the questions that were previously unanswerable now had some factual data. This data was further analyzed using ArcGIS to come up with some conclusions about the habits and ecology of the PA fisher. It was determined that the fisher is most active at night mainly hunting. They utilize the edges of large tree stands more so than the deep forest. The home range was relative to the size of continuous forest that it lived in and the resting areas were located near old and dense forests. This research is on going in order to gain a further understanding of the habits and ecology of the PA fisher but the initial findings give us a general understanding that we can build on.
82. "Analyzing 2004 Uniform Crime Reports Juvenile Arrest Data Using GIS"

Author: Brandi Stewart
Faculty Sponsor: John Benhart

83. "Ceramic Types and Cordage Analysis for the Johnston and Other Sites in the"

Authors: Leland Geletka, Kathryn Gompers, Audrey Lilley, and Susan Lukowski
Faculty Sponsor: Beverly Chiarulli
Recent investigations by archaeological field schools from Indiana University of Pennsylvania have recovered samples of ceramics from the Johnston site on the southern side of the county along the Conemaugh River and the Carl Fleming site along the Crooked Creek in the northern part of the county. While the Johnston site is part of the well known Monongahela culture of southwestern Pennsylvania, the Carl Fleming site is from an area with a less well defined cultural tradition. A preliminary analysis of the ceramics has defined differences and similarities in the two assemblages.

84. "Climate Change in Florida"

Author: Kevin Dodds
Faculty Sponsor: Ruth Shirey
A very popular and controversial issue in our world today is global warming. Climate change is another issue that could go hand in hand with global warming, but may not necessarily be directly related. Since climate change has always occurred on our planet, my research and data sets are going to compare and contrast this phenomenon with the new studies on global warming. Florida is going to be my large scale area of study. Data has been collected from various weather station websites, then graphed and correlated with recent global warming trends in Florida.

85. "Climate Change in This speck of time"

Author: Jonathan Bookamer
Faculty Sponsor: Ruth Shirey
The research investigates the Science in the Global Warming campaign at a micro level. The questions to be answered are as to weather any deduction of climate change can be
made given our current data. The Bush administration refuses to term the phenomena as global warming and prefers the term "Global Climate change". The implications that may point in either direction brings the suggestion of an impending doomsday we believe we can somehow bring to a stop or indications that the region involved possesses a pattern of cycle that has not been altered as of yet. The research will investigate the evidences of the current data using graphical representation, the scientific data presented to date and historical records to date in a search for evidence of any abnormal patterns within the Northeastern United States.

86. "Climatic Change in the Pacific Northwest"

Author: Dan Thomas  
Faculty Sponsor: Ruth Shirey

There is no doubt that climate plays a very significant role in the lives of many people. Climate affects the clothing we wear, the homes we build, and the agricultural products that we consume. It is not the goal of this researcher to provide evidence of the Global Warming phenomena. It is however in my particular interest to observe climatic conditions over a significant period of time in the Pacific Northwest in hopes of determining the direction of temperature change in the region.

87. "Coal Towns of Western Pa"

Author: Carl Rose  
Faculty Sponsor: Ruth Shirey

Coal towns were built throughout the Appalachian coalfields. In Western Pennsylvania, hundreds of these towns were built to house miners' families during the first half of the 20'th century. In Indiana County, a number of these coal towns still are part of the landscape and provide a significant supply of houses for residents. This research project looks at the layout and functions of coal towns in Indiana County originally and in the early 21'st Century.

88. "Crime Analysis of Portland, Oregon"

Author: Louis Early  
Faculty Sponsor: John Benhart

A spatial analysis of crime patterns in Portland, Oregon.
89. "Eyesore to Energy"

*Author: Bernard Nanna*  
*Faculty Sponsor: Ruth Shirey*

Oil price increases result in the search for new and cheaper fuel sources. There are a number of power plants in the continental United States that have taken this challenge by using old refuse piles from previously mined locations and converting it into energy. Coal mining has been part of Pennsylvania's industrial heritage for over 150 years. Indiana County had 75 piles that were logged in with the Pennsylvania Department of Environmental Protection (DEP). Out of those 75 piles 36 have been reclaimed, 38 were sampled for inventory, and 1 has been permitted to be reclaimed. Using the DEP protocol 38 sampled sites produced five that have the potential to be reclaimed with today's technology. So the question is why are these sites still available. Is it due to lack of knowledge, funding, location removal capabilities, or politics, in the sense that permits need to be addressed before moving forward.

90. "Garden Hunting: Using Stable Isotopic Analysis to Determine Deer Behavior"

*Author: Laura Short*  
*Faculty Sponsor: Sarah Neusius*

This poster describes the results of stable carbon isotopic analysis of deer bone and teeth samples from two post AD 1000 sites. Isotopic signatures are expected to vary depending on whether deer were feeding on maize or on wild browse, which may indicate humans' hunting choices. Although other indicators of hunting tactics can be found in faunal assemblages, white-tailed deer (Odocoileus virginianus), a primary resource, might have been hunted in both fields and gardens or pursued in the forest. To the extent that deer behavior can be suggested by isotopic analysis, it will provide greater insight into probable human strategies.

91. "Global Warming and Its Effects on Southern California"

*Author: Joseph Kochinski*  
*Faculty Sponsor: Ruth Shirey*

This poster will cover the effects of global warming on Southern California. I will explore the economic, ecological, and social effects of global warming in this region. I will be collecting weather data from a variety of weather monitoring stations around Southern California. I will also be using books and journal articles from a variety of different organizations.
92. "Graffiti in Pittsburgh"

*Author: Angelo Harris*

*Faculty Sponsor: Ruth Shirey*

Graffiti is a language that can say a lot about a society by its appearance. It uses the urban landscape as a canvas for expressing attitudes of the graffiti culture. Contemporary graffiti was developed in the late 1960's on the east coast of the United States in major cities such as New York and Philadelphia. Graffiti includes words, colors, and shapes that are drawn on both private and public property without consent. This project surveyed the neighborhoods of Oakland, Squirrel Hill, and Shady Side with a technique used by the Pennsylvania Resource Council, in "Graffiti in the South Side" a report published in January 2007. Cross-sections of neighborhoods were analyzed to conclude how the built environment interacts with the graffiti culture.

93. "Historical Philosophies of Warfare apply to Iraq"

*Author: Belinda Arndt*

*Faculty Sponsor: Ray Beisel*

Is the United States pursuing a Just War policy in Iraq? Or Is American policy Machiavellian? By examining the perspectives on warfare of Machiavelli, Augustine, and Thomas Aquinas. We are going to be able to answer these two demanding questions dealing with the Iraqi conflict.

94. "Hoodlebug Trail Access"

*Authors: Michael Baker, Matt Balog, Louis Early, and Sam Veltre*

*Faculty Sponsor: John Benhart*

This project involves looking at the accessibility of the Hoodlebug Trail by all the communities that are along its path. An emphasis will be placed on the barriers that prevent access and places where access is needed. A GIS will be made to incorporate all the necessary information to map access points to the trail and to point out the barriers preventing access. This project is to be accomplished for consideration in the transportation section of the Indiana County Comprehensive Plan.
95. "In memory of Princess Diana"

Author: Caitlin Salsbery
Faculty Sponsor: Ray Beisel

I chose the do my project on Princess Diana, because she was a very caring and helping person, she inspired people to care for one another. The leadership role Diana played in society was showing people how much she cared and understood how life really is. Diana was known for her high-profile-charity work. She wasn't too much of a volunteer for causes, she was the leader in making people volunteer and help with causes for ill people or needy communities. In the mid-to-late 1980's Diana became well known for her charity projects. She engaged in hospital visiting of the sick and to assume the patronage of variety of organizations. Also Princess Diana influenced the campaigning against the use of land mines used in wars. Further more Diana also led the campaigning of decreasing discrimination against victims of AIDS. There was an organization made after Princess Diana died made to carry on her work and influences. The organization was named "Diana the work continues." This organization does many things for people in need. Such as the organization will help people who are dying to go with dignity and with out pain, no matter who it is. The organization would call that palliative care. Also the organization works with Prisoners Families, which is for kids who where judged for a crime they did not commit themselves. Another way the organization reaches out to people is by supporting refugees and asylum seekers who live in certain communities of the United Kingdom. Another activity the organization supports is the campaigning Princess Diana started herself, awareing people about the affects of land mines and explosive remnants of war.

96. "Intraspecies size difference and its effect on the arboreal locomotion of adult and juvenile white faced capuchins (Cebus capucinus)"

Author: Alicia Rich
Faculty Sponsor: Francis Allard

When observing the white faced capuchin (Cebus capucinus), it is quite evident that the significantly small size of this species of monkey is a huge factor in its locomotion and other forms of positional behavior. Fleagle and Mittermeier concluded in 1980 that in arboreal primates with an increase in size comes an increase in climbing and a decrease in leaping. Several other researchers have concluded that a strong relationship exists between size and positional behavior in other species of primates since then. Many of these projects attempt to examine such a relationship by comparing species of primates with similar lifestyles and habitats but different sizes, while others look at intraspecies size differences by comparing males and females with considerable size differences due to sexual dimorphism. Another possible way of isolating size and controlling for other variables is to compare the locomotion of adults and juveniles within one species. Based on this size difference and past research, one might hypothesize that differences in the locomotion exhibited by adult and juvenile Cebus capucinus will exist.
The arboreal locomotion patterns of adult and juvenile Cebus capucinus were studied in the tropical rainforest habitat of La Suerte Biological Field Station in northeastern Costa Rica from June 9, 2006 to June 16, 2006. A strong relationship between size and locomotion patterns was witnessed during this time. Adults exhibited more climbing and less leaping than juveniles, which supported the initial hypothesis, although much more data is needed to claim any conclusive results.

97. "Invasive Killer"

Author: Chadd Sober
Faculty Sponsor: Ruth Shirey
Ailanthus tree is an invasive specie that brings many different problems to our native plants and trees in the United States. I will be showing why the tree thrives where it does and some potential ideas to stop the tree from spreading more than it already has. I will be looking at what this tree will do to our forests and also to sidewalks and roadways. I will discuss some of the eradication techniques and what some states have done with this problem. I will show a few maps of areas from Pennsylvania that I know of that have been overrun with this tree. Lastly I will show you what this tree can do to our forests and native species and also what it can do to urban areas.

98. "Little Mahoning Creek Project"

Authors: Alex Anderson and Michael Lesnock
Faculty Sponsor: John Benhart
We worked with the Western Pa Conservancy in the Little Mahoning Creek Watershed to assess stream conditions throughout the riparian zones in the watershed. Maps were created to display land cover, soil erosion, soil type, and orthographic photos to help understand the streams conditions.

99. "New Perspectives from New Investigations at Some Old Sites"

Authors: Justin DeMaio, Kellen Hinrichsen, and Celeste Mazza
Faculty Sponsor: Sarah Neusius
One focus of the IUP Late Prehistoric Project has been the re-investigation of sites first excavated from 20 to 50 years ago. In 2006 and 2004, archaeological Field Schools excavated at the Johnston and Carl Fleming Sites in Indiana County. As a result, we have collected data that have changed our perspectives on these sites and contributed to our understanding of the Late Prehistoric cultures in the Conemaugh River and Crooked Creek watersheds.
100. "PA Game Commission"

Authors: Andrew Jurczak and Carl Rose
Faculty Sponsor: John Benhart

For our project we are creating a GIS data base for the Pennsylvania Game Commission we are focusing our attention on game land 248 near Two lick Reservoir. We are gathering information about the game land and creating the pilot GIS based on their criteria and our findings.

101. "PA Game Commission GIS"

Authors: Dain Frantz and Dan Thomas
Faculty Sponsor: John Benhart

A Geographic Information System for the Pennsylvania Game Commission will benefit the commission with the planning and overall management of their game lands. This project aims to identify features on state game land 273 located in Indiana, County. By identifying the location of the most important features and mapping them using a GIS, the PGC employee or end-user will be able to locate, query, and/or have the ability to make proficient decisions. This will inevitably provide the PGC with a more organized way to maintain their game lands.

102. "Pennsylvania Game Commission's policies affecting the population of the Whitetail Deer"

Author: Tye Desiderio
Faculty Sponsor: Ruth Shirey

Policies affecting the whitetail deer by the Pennsylvania Game Commission is my topic of study. I have looked at past and recent data to decide if today's nature would be better with more or less of the animal. I am also sorting this by all counties in Pennsylvania. Information of harvested animals during the Pennsylvania hunting will also be studied.
103. "Post-Socialist Warsaw - A City in Transition"

Author: Gregg Culver  
Faculty Sponsor: Ruth Shirey

The transformation process from a centrally-planned socialist economy to a free market economy has led to great change in the cities of Central and Eastern Europe. Based on a series of forces of the transformation process, this research considers the effect of the forces of the transformation process in Warsaw, Poland's situation as a post-socialist and new EU member metropolis. The city's place in Poland's urban network is also analyzed.

104. "Ride Like the Wind: Outmigration from Cambria County 1970-2005"

Author: Larry Kleitches  
Faculty Sponsor: Ruth Shirey

Since 1970, the population of Cambria County, Pennsylvania, has dropped every decade as migration patterns take people out of the county. Many reasons have been cited, all of them tied into negative connotations: the county's climate is depressing, the job market is depressing, the quality of education is depressing, and so forth. Are these the actual reasons, either singularly or in combination, that people are migrating to other places, or are there other grounds for this migration?

105. "Saving money while saving the environment"

Author: Paul Holub  
Faculty Sponsor: Ruth Shirey

Geothermal heating has already eliminated heating bills for many households. What possibilities are there in terms of eliminating electric bills through wind energy, or is there even a possibility of eliminating fuel pump costs through new technologies such as cars that are powered by compressed air alone? There will be a geographic component that will examine how real estate and community planning will change and adapt to these possibilities in terms of such things as lot sizes and zoning. This investigation will be carried out by first examining both the contemporary and potential viability of green technologies, and then applying those findings to a given area to examine such things as affordability and availability.
106. "Stealing the New World From Spain: The Geography of Maritime Piracy"

Author: Greg Halldin  
Faculty Sponsor: Ruth Shirey
Maritime piracy has been occurring since humans first took to the seas. This activity was especially prevalent in the 16th through 18th centuries in the era of European colonialism in the Americas. This project is a study of how geographic features such as islands, coastlines, wind and water currents, etc. influenced the activity of those involved.

107. "The Cause and Effect of Global Warming in the Northeastern United States"

Author: Kevin Vogt  
Faculty Sponsor: Ruth Shirey
The causes and effects of global warming in the northeastern United States is the focus of this project. I have used data that has been collected through the past seventy three years and have graphed and analyzed climate change in this region. Tables and graphs will provide significant amount of factual climatic data on how climate change has been affecting the greater New England Area of the United States. By collecting and analyzing data from weather station in the New England area, I have been able to compare directions of change in climate in New England with those reported for the United States and the world.


Author: Andrew Heller  
Faculty Sponsor: Beverly Chiarulli
Geophysical remote sensing has found many applications in archaeology. Electrical resistivity, magnetic gradiometry, and magnetic susceptibility are examined to test usefulness of these techniques at a late prehistoric site in Westmoreland County.

109. "The Impact of Urban Sprawl in North-Central Washington County Using a Landsat Image Analysis"

Author: Michael Lesnock  
Faculty Sponsor: Ruth Shirey
Urban Sprawl can be defined as the loss of agricultural and natural areas due to developments such as housing and business. This is a problem plaguing most metropolitan areas across the United States, especially Pennsylvania. For my project I am going to look at
how urban sprawl has effected Washington County, an area within the Pittsburgh metropolitan area and is Southwestern Pennsylvania. This will be along Interstates 70 and 79 and along part of Route 19. I will be using the remote-sensing program, MicroMSI. These images will be taken from the years 1986, 1993, and 2001.

110. "The influence of population on Ginseng buyers in Pennsylvania"

Author: Ian Buggey
Faculty Sponsor: Ruth Shirey

Ginseng is a very valuable wild root that grows here in western Pennsylvania and throughout the Appalachians. You can ingest ginseng via drinks like Jolt Cola, Lipton Ice Tea, or Arizona Ice Tea. The question I have is how does population affect the location and price of wild ginseng plant harvest in Pennsylvania. I believe that ginseng buyers who are located in areas of higher population will not necessarily have greater income levels, than the buyers who are located in areas of less population. So the question is, how does population and location affect the buyers income?

111. "Using Synthetic Aperture Radar to search for oil slicks"

Author: Matthew Balog
Faculty Sponsor: Ruth Shirey

Synthetic Aperture Radar (SAR) can be used for identifying ocean oil slicks and their sources. This project looks at the physical characteristics that distinguish oil slicks from the ocean surface and examines the data that can be collected from the various sensors associated with SAR.

112. "Utilizing GIS to study fisher habitat in SW Pennsylvania"

Authors: Jonathan Gallardy and Aaron Kovach
Faculty Sponsor: John Benhart

In 1994, the Pennsylvania Game Commission (PGC) reintroduced fishers (Martes pennanti) back into areas of Pennsylvania where they had previously been extirpated. This reintroduction, along with movement of fishers from other states such as West Virginia and New York are thought to be the main cause behind an increase in fisher occurrences in the past several decades throughout many forested regions of the state. Because of the overall lack of data characterizing fishers in Pennsylvania ecosystems, the PGC and IUP have been working cooperatively to examine ecology of this species in areas where they are known to
exist. We will utilize Geographic Information Systems (GIS) to identify habitat selection by fishers in south central Pennsylvania. Ultimately, this information will provide researchers with accurate and pertinent data with which they will be able to make confident management recommendations for the conservation of this species statewide.

113. "Wildland-Urban Interface in Wildfire Management"

Author: Michael Baker

Faculty Sponsor: Ruth Shirey

Urban areas in Colorado are spreading out into the suburban regions interacting with the wildland-urban interface, fire activity, and vegetation. This interaction interferes with the natural processes of fire as an ecological management tool. Suburbs are growing out, into areas where wildfires are common events, displacing natural vegetation. As a consequence, vegetation fuel loads are increasing the intensity and scale of fires. Management practices are important to keep these fires at safe level that doesn't cause large scale destruction of residential units. It is important for these practices to maintain the natural ecosystem. Data from Boulder County, Colorado, will be analyzed to identify the wildland-urban interface in this region of the west.
114. "Analysis of a Call Center's "Click-to-Call" feature"

Author: Christine Kester
Faculty Sponsor: Yu-Ju Kuo

My research is to analyze the new click-to-call customer service feature of a large Call Center. This feature is meant to improve customer service by giving the customer the option of having a customer service representative return their call when available. This prevents the customer having to waste time remining on hold while the representatives are busy. My intention is to analyze the increased use of this service in relation to the rapid growth of a major Call Center using simulation models and past growth rates. The analysis will produce results to estimate the staffing needs of the Call Center as the customer service feature becomes more popular.

115. "Characteristics of neonatal elk resting sites in northcentral Pennsylvania"

Author: Melia DeVivo
Faculty Sponsor: Jeffery Larkin

In the 1990's the Pennsylvania Game Commission began several habitat enhancement projects intended to promote elk population growth. While several of these projects have been completed, research is needed to evaluate their success. Moreover, minimal information exists regarding eastern elk habitat use, and no data are available for elk habitat selection in Pennsylvania. We examined habitat characteristics of neonate elk (7 days old) resting sites, a habitat component critical to elk population growth. Such information is necessary for effective management that promotes population growth and long-term viability of Pennsylvania elk. Habitat data were collected at 37 neonate resting locations (22 from 2005 and 15 from 2006) in north-central Pennsylvania. Habitat characteristics of the neonatal sites were recorded within a 0.04 ha circular plot centered around each rest site location. Habitat characteristics included distance to edge, distance to roads, distance to water, slope, aspect, % grass, % forbs, % ferns, shrub height, shrub density, course debris (i.e., large rocks and logs), % canopy cover, canopy height, and basal area. Data obtained from neonatal resting sites were compared to data obtained from 35 random sites to determine the degree of rest site selection by neonatal elk. Resting sites were closer to edge
and had higher amounts of forbs compared to random locations. Our data suggest that resting sites were selected by elk to meet security needs of neonates and forage and cover requirements for lactating cows. The results from this work combined with those from an ongoing study will aid in the enhancement and preservation of critical habitats used by Pennsylvania elk.

116. "College Students Attribution of Blame in a Domestically Violence Situation"

**Author:** Heather Humphries  
**Faculty Sponsor:** Beverly Goodwin

Domestic violence is a huge problem in today's society. In a recent study, it was found that 5.3 million women and 3.2 million men report being the victim of interpersonal violence. Most of the research and emphasis in our society revolves around men being the abuser and women being the victim, but more evidence is being presented that males are being victimized as much, if not more, than females. Males, however, are not reporting their abuse as much as females. This study will compare how college students rate the blame of victims/perpetrators in one of two different situations, a male perpetrator with a female victim or a female perpetrator with a male victim, to compare how they rate the blame of males versus females in the different situations in accordance with their scores (high or low) on the belief in a just world scale.

117. "Dendrimer Biomimetic of Carbonic Anhydrase Catalyst"

**Author:** Adam Crain  
**Faculty Sponsor:** Heba Abourahma

Active site encapsulation by catalytic dendrimers will be investigated in this experiment. The dendrimer models proposed are based on the crystal structure of the erythrocyte enzyme carbonic anhydrase. The core of these biomimetic structures will represent the active site of the enzyme and will be composed of either tridentate or tetratentite imidazole ligands that coordinate a single zinc ion. The catalytic ability of the dendrimers will be investigated for each of the tri- and tetratentite coordinated species. Rate of catalysis and the shape/ratio of encapsulation will be investigated for higher dendrimer generations of the enzyme models. Saturated solutions of carbon dioxide will be prepared by acidification of NaHCO3 with HClO4 in distilled water. The dendrimers will be combined with Hepps and m-cresol purple to determine the rate of the forward reaction. Catalytic rate will be determined by a stopped flow spectrophotometer technique at 25 C.
"Do you know who's watching?"

*Authors: Lindsey Bertugli, Jennifer Hiserodt, and Melissa Karolewski*

*Faculty Sponsor: Rosemary Shumba*

Is Big Brother Watching our Every Move? Can the clothes on our backs track us? How does the supermarket know which coupons to print out for us? Biometric and RFID (Radio Frequency Identification Devices) systems have been increasingly deployed over the past years with mixed results on their effectiveness. General public acceptance and understanding of biometrics, while increasing in some areas, is still slow. This group session describes the security of existing biometric and RFID devices and the associated ethical and privacy issues. This work is part of a project, "Biometric Devices and Security", sponsored by ACM-CRAW CREU. The goals of the project are to investigate the public's understanding and acceptance of auto-ID devices as a method of user authentication. Biometric Devices Biometric devices are becoming more and more widely used for security purposes. Although effectiveness varies from one device to another, biometric devices are proving to be an asset. The types of biometrics currently employed include fingerprint scanners, hand geometry scanners, voice recognition, iris recognition, and facial recognition. Each type has its pros and cons, but biometrics, in one form or another, are a security solution available to almost anyone. This part of the presentation will focus on the differences among the various biometric devices. Radio Frequency Identification Although still fairly uncommon, RFID's are slowly making their way into business and industry. Some companies, such as Citywatcher.com, are requiring their employees to be "chipped" with an RFID for security and access reasons. Although the invasive nature of this technology is extremely controversial, it is slowly becoming a more popular form of authentication and data transfer. This part of the presentation will describe the different RFID devices and how they work. Ethics: Biometrics & RFID As part of the project to investigate the public understanding and acceptance of auto-ID devices as a method of user authentication, an online questionnaire survey was administered to the IUP community in March 2007. Although we are in the midst of what may become one of the true technological transformations of our time, there are mixed views among the various interest groups about whether the use of the auto-ID technologies is privacy enhancing or privacy invasive. This part of the presentation will cover the results of the questionnaire administered and the ethical concerns with both biometrics and RFID.

"DOES DETERMINISTIC PROCESSES OF MODEL BIACCUMULATION YEILD A BETTER RESULT THAN STOCHASTIC PROCESSES?"

*Author: Chiemezie Onyeachu*

*Faculty Sponsor: Chana Navaratna*

DOES DETERMINISTIC PROCESSES OF MODEL BIACCUMULATION YEILD A BETTER RESULT THAN STOCHASTIC PROCESSES? Author. ONYEACHU CHIEMEZIE In biological systems, uptake of materials is referred to as bioaccumulation. The theory of bioaccumulation is greatly related to population models because the intake of
materials is an important and timely repeated process in nature. The materials a given organism takes in can be used as energy and sometimes the organism cannot use it. This material that cannot not be metabolically disposed off the organisms starts to accumulate, this process refers to bioaccumulation. For instance, Diabetes mellitus type 2 results from accumulation of starch. When starch is taken in excess, it is stored as fat making the body cells resist insulin. Is the accumulation process linear, can we predict the amount one has to take to be diabetic, can it represented using simple mathematical models? Secondly, how far can this be taken; is there a point where the accumulation reaches equilibrium (saturated level of concentration), can it be predicted, can the effects within the ecosystem be represented in the model. The answer to the preceding question is not certain but bioaccumulation can be modeled mathematically however, my work involves coming up with two models using Differential equations (deterministic processes) and Linear Algebra (stochastic processes) for a given system; analyzing the two and determining which one gives a more reliable result. Mathematical biology is an important aspect of science know as biomathematics, there are researches going-on on biological systems and a lot ways to model these systems mathematically, knowing and making use of the most efficient way is important for accuracy.

120. "Does Misinformation Moderate the Effects of Postidentification Feedback on Eyewitness Identification Testimony?"

Author: Tawnee Alwine
Faculty Sponsor: Daniel Sadler

In a study by Wells and Bradfield (1998), participants first viewed a video of a crime, and identified the perpetrator in a photospread that excluded the actual perpetrator. Results showed that identification confidence increased following confirming feedback and decreased following disconfirming feedback. Eyewitness memory can also be influenced by misinformation. Misleading cues are often present before or during eyewitness identifications. Mudd and Govern (2004) found that nearly 50% of participants who watched a car chase video incorporated misinformation from a confederate into their memories, and their confidence in their memory increased over time. The present study examined whether misinformation moderates the effect of feedback on identification confidence. After watching a crime video, participants identified the perpetrator in a photospread excluding the actual perpetrator. The participant received one of four feedbacks: confirming, disconfirming (false)-perpetrator was someone else in lineup, disconfirming (true)-perpetrator was not present, or no feedback. While engaging the participant in conversation, a confederate either planted or did not plant a misleading cue to either reinforce or mitigate the participant's identification. The Wells and Bradfield questionnaire measuring qualities of eyewitness identification testimony was administered. As expected, feedback significantly affected a number of qualities (7 of 11), including certainty of identification accuracy and willingness to testify. There was also a main effect of misinformation on 3 qualities, and a feedback x misinformation interaction for 2 qualities. For certainty of accuracy, the mean rating for confirming feedback was significantly greater than the mean for no feedback which was greater than for
disconfirming feedback—true. For willingness to testify, an analysis of feedback x misinformation interaction found a simple effect of feedback at each level of misinformation. For reinforcing misinformation, there was no difference in willingness to testify between confirming and no feedback, and no feedback was higher than both disconfirming groups. For both the mitigating cue and no cue, willingness to testify was greater for confirming than for no feedback, which did not differ from the disconfirming groups. For simple effects of misinformation within feedback, misinformation affected willingness to testify in the no-feedback condition such that a reinforcing cue resulted in more willingness. Overall, the results support earlier findings that confirming feedback increases confidence in false eyewitness identification, and show that disconfirming feedback that indicates the suspect was not present in the lineup decreases confidence. In addition, misleading information that reinforces false identification by itself (i.e., without feedback) can increase confidence in identification.

121. "Harmful or Harmless: The Effects of Television Usage on Society's Perception of the Black Population"

Author: Laura Briscoe

Faculty Sponsor: Gordon Hannah

Television is a powerful medium of communication. It acts as the prevailing source of entertainment and information for the public, and previous research suggests that television acts as a catalyst for the formation of stereotypes (Cullingford, 2000). As a minority population, African Americans have been targets of stereotypical portrayals. Characterizations centered on racist beliefs about African Americans have been prevalent on stage and in television. Numerous modern sitcoms seem to contain implicit stereotypes of black people. When it comes to the African American family, television tends to portray the black family in a debasing light (Berry, 1998) and suggests dysfunction and instability. African-American characters' mannerisms are also often centered-around buffoonery and senseless behavior (Hammer, 1992). Previous research has shown that television significantly effects the perception of African-Americans and negative stereotypes have emerged as a result of watching black entertainment television (Fujioza, 1999; Ford, 1997). Cultivation analysis research investigates how exposure to television affects perceptions of social reality. It hypothesizes that heavy and light television viewers demonstrate differences in belief based on their viewing habits (Morgan & Signorielli, 1990). Heavy viewers are hypothesized to have beliefs that more closely reflect the reality presented to them on television. Personal experience, however, is believed to moderate the relationship between television viewing and beliefs. Contact plays a fundamental role in how people form opinions of others (Entman & Rojecki, 2000). Individuals with personal experience of a particular phenomenon tend to be less influenced by television portrayals of the phenomenon. Taking this into account, more experience (direct contact) with African-Americans offsets the influence of negative television portrayals. Based on the above research, the following hypotheses were derived: H1: Heavy television viewing will be associated with increased stereotypes of black families being dysfunctional (direct personal contact will moderate this relationship). H2: Heavy television viewing will be associated
with increased stereotypes of black population being irresponsible (direct personal contact will moderate this relationship). A survey design was used which measured sitcoms, family structure, family functioning (dysfunction), and irresponsibility. Contrary to expectations, no significant correlations were found between viewing sitcoms, direct contact, and stereotypes. Also, no moderator effects of personal contact were found on the relationship between television viewing and stereotypes. Reasons for non-significant results and other unexpected findings will be discussed.

122. "Hemispheric Asymmetry of HVC Auditory Neural Response"

Author: Dominic Luciano
Faculty Sponsor: Paul Nealen
The maintenance of vocalizations in adult birds is mediated by the anterior forebrain pathway which allows for auditory feedback to be compared with vocal production. Motor control responsible for the vocalization of song is mediated by independent left and right input from descending nerve tracts. The motor control pathway and auditory processing pathways in both hemispheres include neural region HVC (used as proper name) which may serve to integrate auditory and motor neural signals. Even though no anatomical hemispheric asymmetry exists, asymmetry of function has been observed in other areas of these pathways. To assess the existence of auditory neural asymmetry in the song neural system awake subjects were presented auditory stimuli consisting of the bird's own song (BOS) and frequency modified versions of their own song while bilateral neurophysiological recordings from HVC were made. Both hemispheres exhibited robust auditory neural responses with the strongest response to BOS. These findings show that the left HVC response pattern to the song auditory feedback was different than that of the right HVC. The most significant difference between HVC responses occurred in the range of 6000 Hz to 6500 Hz. These findings suggest some lateral specialization in the auditory response of HVC based on frequency. This finding could be due to the need for hemisphere-specific guidance of the motor control of song. Furthermore, the partial independence of left and right auditory processing could be a means of distributing the neural processing responsibility of song.

123. "Learner's Model of Chemical Equilibrium"

Author: Sara Krull
Faculty Sponsor: Michael Briggs
What are you thinking about right now? The mind is a powerful tool that makes humans different from other species. As conscious beings we are constantly thinking about and processing ideas and information. The objective of this research is to observe and analyze the thought processes that are used by learners when performing a thought revealing
activity that we designed and the significant findings of this research will be presented in a new model of how students construct the concept of chemical equilibrium.

124. "Perceived Virtues and Societal Stereotypes of Relational and Agentic Achievement Across Race and Gender"

Author: Shane Moulton
Faculty Sponsor: Maureen McHugh

Traditionally, achievement in America is based on the result of arduous, individual endeavors with an emphasis on competition and "reaching the top". These attitudes for achieving come as a result of the impositions of the social group that dominates the culture and defines its rules. The purpose of this research is to approximate the degree to which social groups (White female, Black female, and White male) are most highly regarded for achievement using two, seemingly bi-polar achieving styles (agentic and relational). A classical experiment utilizing a series of vignettes depicting White females, Black females, and White males will be offered to study participants (white male IUP undergraduates) who will assess them with a questionnaire designed by the researcher. It is hypothesized that both Black and White female targets will be perceived positively for achieving by relational means while experiencing some degree of backlash for utilizing agentic achieving styles. It is further hypothesized that the White male target will be perceived positively for achieving by agentic means while experiencing some degree of backlash for achieving by relational styles. Results and potential implications will be discussed.

125. "The Electromagnetic Spectra of GaAs"

Authors: Jason DiDomenico, Louis Kish, and Robert Steinman
Faculty Sponsor: Devki Talwar

The work we conducted focused on the model of the dielectric function and the calculation of the reflectivity of GaAs and GaNAs using FORTRAN, C++, and Mathematica computer programs. We focused on the research of other scientists at different universities in order to determine the error in their original analysis of the dielectric effect.

126. "What would happen if students designed their own science labs?"

Authors: Chad Shelly and Rachel Zimmerman
Faculty Sponsor: Thomas Lord

Inquiry based labs have drastically increased learning and positive attitudes towards science in introductory college science classes. There is a lack of research; however, in the upper level science classrooms, where information is more in-depth and labs are more involved.
This poses obstacles to inquiry labs, which require students to design their own experiments. In the spring semester of 2007 an inquiry based botany class, BIOL 210, was implemented. Based on observations there have been similar positive results in Botany as others have found in introductory science classes. Towards the end of the semester a survey will be distributed to the students to assess their attitudes about the inquiry laboratory. These results will be used to evaluate the botany curriculum and to begin a prolonged study on the effect of inquiry based labs on the attitudes and learning of students in botany.

Posters

127. "A Novel Synthesis of Iodohydrins Derived from Styrene and Related Compounds"

Authors: Amanda Davis and Joseph Zewe
Faculty Sponsor: Carl LeBlond

The purpose of our research is to optimize a novel pathway for the synthesis of iodohydrin compounds, derived from styrene and similar chemicals. Iodohydrins are important in a variety of industrial and pharmaceutical applications, because they are often an intermediate in the synthesis of biologically active pharmaceuticals and specialty chemicals. Recently, a new procedure for the synthesis of iodohydrins was developed in our laboratory. Unlike a more common method, which employs N-chlorosuccinimide (NCS), this procedure for the iodohydroxylation of styrene utilizes sodium hypochlorite (bleach) as a more environmentally favorable and cost effective oxidizing agent. A yield of 81% iodohydrin product (isolated, characterized and determined by GC/MS and 1H NMR) has been achieved using styrene as the substrate. In our presentation, we intend to detail this result as well as our plans for future explorations.

128. "Analysis of the AX2E molecules using the NBI model; the physical basis for the lone pair effect."

Author: Chad Myers
Faculty Sponsor: Ronald See

The effect of stereochemical, non-bonding electrons, also called the lone pair effect, on the geometry of molecules is a universally recognized phenomenon. Common conceptual models of molecular geometry, such as hybridization and VSEPR, give a qualitative estimation of the result of the lone pair effect, but neither includes a realistic physical basis for the observed molecular distortions caused by stereochemical lone pairs. An analysis of the AX2E (carbenes and their Si and Ge analogues) was performed, using computations at the MP2/6-31G** level. It was found that the stabilization energy provided by the stereochemical electrons is a linear function of the X-A-X angle, indicating that the radial space available to the stereochemical electrons about the central atom is the primary
physical force resulting in the lone pair effect. This result is consistent with the Non-Bonded Interaction model, and constitutes evidence that this model provides a more physically realistic picture of molecular geometry.

129. "Applications of Linear Algebra in Garnets"

Author: Jessica Nichol
Faculty Sponsor: Channa Nisantha Navaratna

The purpose is to synthesize magnetic garnets using the high temperature precursor method. Garnets are a family of solids that can exhibit cooperative magnetic behavior depending on their composition, crystal structure, and temperature. In this case the lanthanide containing garnet, Gd₃Fe₅O₁₂, was synthesized. The magnetic properties of these materials can be modified by varying the identity of the lanthanide element. Linear algebra will then be used to calculate a number of crystallographic parameters including unit cell volume, bond distances, and bond angles.

130. "Biochemical Analysis of Pondberry Seed Viability"

Author: Robert Bauer
Faculty Sponsor: Sharon Sowa

The pondberry is an endangered species important to the ecosystems of the southern United States, including the Mississippi Delta. These plants spend much of their lifecycle submerged under water, and little is known about the biochemistry of seed development, maturation, and germination. Using a powerful yet convenient method, Fourier-transform infrared spectroscopy or FT-IR; we intend to examine changes in macromolecular structures during the development and stratification of these seeds. This technique works by means of measuring the vibrations of dipoles in molecules, whereby structural characteristics of proteins, membranes, carbohydrates, and even seed moisture content, can be determined by means of intact tissue samples.

Our experiments are designed to measure these biochemical changes in the seeds as they mature during a period of seven months. We also intend to measure the relationship between seed moisture content, changes that occur during cold stratification, and viability in order to determine whether the pondberry is actually a recalcitrant (desiccation-sensitive) species. This information is intended to aide in the development of proper techniques for possible long term storage of the pondberries. In addition we intend to find out what happens on a molecular basis via use of FT-IR during the 6-month period of exposure to cold temperatures that seems necessary for germination to occur. Particular attention will be paid to FT-IR absorption frequencies in the range of 3100 -2800 cm⁻¹ as this range is representative of C-H stretching of lipids, 1650-1550 cm -¹ as this is representative of protein secondary structure and lastly in the "fingerprint regions" as they may provide a visual representation of a possible change in the physical structure of the molecule. (Sowa,
1991) A short-term (24-hour) drying experiment was followed by sub-sampling and stratification of seeds of varying moisture contents: 24.65% wt. (0 hours short term drying) - 6.72% wt (24 hours short term drying) Measurements of O2 uptake have also been observed during the stratification process, and will be used as an additional indicator of seed viability. The FT-IR along with Moisture content will be correlated with length of stratification to explain any change in respiratory activity (O2 uptake) and seed viability.

131. "Calorimetry through Guided Inquiry"

Authors: Thomas Lieb and Robert Turnbull

Faculty Sponsor: Anne Kondo

By turning a regular experiment into a guided inquiry it will be determined as to whether positions of different metals on the periodic table, has an effect on their heat capacity. Calorimetry will be used to measure the heat capacity of different metals (Zn, Al, Pb, Cu, Fe). After finding the heat capacity of the calorimeter the heat of the fusion of ice will be tested and then compared with the actual numbers in order to see how effective the calorimeter was. Styrofoam cups will be used for the calorimeter. The original experiment was simply testing the heat capacity of different metals. The experiment was altered from its original state by adding and changing the metals tested and also by adding the heat of the fusion of ice. Testing the heat of fusion of ice will allow a comparison to be made to the actual numbers and therefore show how accurate the fabricated calorimeter is.

132. "Co-Crystallization as a Strategy to Improving Solubility of Theophylline"

Author: Nicole Morozowich

Faculty Sponsor: Heba Abourahma

Crystal Engineering is a rapidly expanding field that relies on the understanding and exploitation of intermolecular interactions for the design of solids with specific properties. Since the physical properties are directly affected by the solid state, crystal engineering allows for modifying properties of a substance by exploiting non-covalent interactions. Co-crystals are multi-component crystalline materials of two or more solids. Co-crystals of active pharmaceutical ingredients (APIs) are new composition of matter with new physical properties that are different than the pure components of the co-crystal. 60% of pharmaceutical compounds in development and marketed drugs are poorly soluble; co-crystals of APIs offer a way to modify the physical properties of the API without making or breaking covalent bonds. Theophylline, a muscle relaxant used in long acting bronchodilators, has relatively poor solubility (1g/120 mL). Our strategy to improve the solubility and bioavailability of theophylline is to co-crystallize it with complementary co-
crystal formers. Some of the co-crystal formers that we have utilized are cyanuric acid, benzoic acid, phenol, and 2-aminopyridine. This poster will discuss in more detail the synthetic and characterization methods of the co-crystallization of theophylline with the co-crystal formers mentioned above.

133. "Comparative Review of Data Search and Retrieval among Operating Systems"

Authors: Gerald Holf and Robert Trimble
Faculty Sponsor: Soundararajan Ezekiel

Over the past few decades, more and more information has been stored in electronic format and processed by computers. Documents and files that once existed only in hard copy are now available electronically. These documents are stored differently between different operating systems such as Windows, Linux, UNIX, and Mac OSX. One of the major concerns is the efficiency which data can be accessed. There are many ways that data can be stored to reduce access time. These include data structures like trees, maps, and various searches. In this paper we will examine several operating systems, identify the methods used to store and retrieve data, and propose several solutions to improve file system efficiency.


Authors: Gerald Holf and Robert Trimble
Faculty Sponsor: Soundararajan Ezekiel

Information is stored in computers in electronic format, making it accessible via network; this information is stored differently between different operating system. Accessing and sharing of information via network is creates many security problems. Some of them can be addressed to how to avoid the unauthorized access to the data, to maintain the data integrity, and to choose an operating system for the specific operative environment. Often there is not a "best" or "worst" operating system; it only depends on the environment where the operating system is used. Each operating system has advantages as well as disadvantages in relation to the operative environment. The security mechanism related to the file access permissions that an operating system has, is perhaps one of the major actors when choosing what operating system is most appropriate for a specific operative environment. In this poster, we will examine four different operating systems, identify the most common vulnerabilities when managing file access and data integrity, and propose the appropriate operating environment for each of them. The systems are UNIX, Linux: Mac OS X, Windows.
135. "Comparative Study of Investigative Techniques among Digital Forensic Methods"

Authors: Sean Dalton, Bryan Keller, Zachary Rensko, and Robert Trimble
Faculty Sponsor: Soundararajan Ezekiel

Digital Forensics is the science of applying technologies to legal questions arising from criminal investigations. One aspect of digital forensics involves mining computer hardware and software to obtain evidence that is permissible in a court of law and that will make it possible to identify and subsequently prosecute cyber criminals. The evidence left behind can be in the form of hard drives, removable media, logs, and other digital activity. Therefore the primary goals of this project to evaluate existing digital forensics techniques, tools, and research methods and to determine which methods are most efficient and accurate.

136. "Computational characterization of pH-dependent properties in protein active sites"

Author: Jessica Wishard
Faculty Sponsor: Jaeju Ko

Electrostatic forces are believed to play a major role in enzyme catalysis. THEMATICS, a highly selective method for identifying enzyme active sites, measures the perturbation of a protein's charge state as a function of pH (i.e, the pH-titration curve) and is based on a purely electrostatic Poisson-Boltzmann method. In this work, we use THEMATICS to examine the effect of the dielectric constant, the intrinsic pKa's and the interaction energies on the pH-titration curve of each amino acid residue in selected enzymes. We show that while the choice of the dielectric constant for the protein interior affects the perturbation, it does not affect the relative degree of perturbation. That is, for the proteins tested, the ranked lists of the most perturbed to the least perturbed residue obtained from two different dielectric constants differ very little. We also show that high interaction energies AND matched intrinsic pKa's among the ionizable residues in and around the active sites are the key ingredients for enzyme active sites. The matched intrinsic pKa's imply that the proton binding (ionization) energies are nearly the same for the residues in the active sites while the high interaction energies cause the active site residues to remain charged over a wider range of pH.

137. "Concepts of Chromatography through Guided Inquiry"

Authors: Olumayowa Azeez, Herbert Gregg, and Andrew Newton
Faculty Sponsor: Anne Kondo

As first year college students, we have been exposed to various lab experiments through a method known as guided inquiry. Our task is to transform and evaluate a conventional and detailed laboratory experiment into a guided inquiry so that we may enhance the learning
process that goes along with the experience. We plan to do this by formulating questions and creating diagrams which the students have to complete as they perform the experiment, which will cause students to ask themselves questions about what is taking place as they conduct the experiment. The experiment that we have chosen deals with chromatography--students will be asked to separate and identify the FD&C dyes that are found in M&Ms and/or Skittles. While chromatography is an in-depth, widely used procedure, this experiment is relatively inexpensive. The traditional approach is to simply give the instructions and brief explanations of what is happening during the experiment, but we have purposely omitted some of the explanations and made them into questions so that the students themselves can offer reasons and interpretations.

138. "Concepts of Identifying Arson through Guided Inquiry"

Authors: Matthew Browe, Ian Koplin, and Melissa Moore
Faculty Sponsor: Anne Kondo

Traditionally, experiments in chemistry, including forensic chemistry, are presented in a "cook-book" method designed to develop one's experimental techniques in the manner similar to following a recipe. In order to have one develop their own understanding, and hopefully a deeper one, of the underlying concepts guided inquiry experiments are used providing less detailed instructions thus allowing students to "find out for themselves." In the project we are presenting, we will turn a traditional experiment about evaporation rates in forensic chemistry to determine the possibility of arson into a guided inquiry experiment. The experimental technique we will be using is evaporation rates. The traditional approach is to give the students the rates when they are given the samples they will be working with. Our modified experiment will not give the students evaporation rates of the evidence they are working with, rather they will have to compare it to known evaporation rates of chemicals to decipher what chemicals may or may not have been used to start a fire.

139. "Concepts of Spectrophotometry through Guided Inquiry"

Authors: Andrew Adams, Jenna Gazzola, James Shellhammer, and Justin Williams
Faculty Sponsor: Anne Kondo

Our forensics experiment is based on infrared spectrophotometry by way of guided inquiry. The students will learn via guided inquiry because frequently during the experiment, they will be asked what they think is happening, and why they think it is happening. Aspects such as electronegativity and other noticeable trends of the periodic chart will come into play. The students will be given readouts from common, known substances, and then given readouts from substances unknown to them, and they will be asked if they could guess what elements are present in the sample. In order to gauge the success of our altered experiment, we will compare the found results with the correct results in the original experiment; we
will also check their reasoning through our own research in this area. It is through this process that the students will draw their own conclusions to the chemistry of infrared spectrophotometry.

140. "Do Coping Strategies Impact Health"

Author: Kimberly Hyatt
Faculty Sponsor: Lynda Federoff

Depression is a mental health issue that has been linked to physical symptoms and illnesses. A study conducted by Burack et al in 1993 showed that there was a faster decline in a particular type of lymphocyte important for immune response in HIV-infected men. This decline was not observed in HIV-men who were not classified as depressed. Other studies have addressed the association between depression and mortality after experiencing a myocardial infarction (MI), showing that there is a greater risk of mortality within 6 months following an MI in those who were met the criteria for major depression. The literature shows that the impact of depression on physical illness not only has physical consequences, but also has effects on mental states and well-being. One factor that has been linked to the way people perceive and interpret stress is one's coping resources. Coping has been defined as cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person (Lazarus & Folkman, 1984, p. 141). It has been hypothesized that coping strategies may have either a positive or negative effect on physical and mental health. This study was the continuation of a study first conducted by Dr. Lynda Federoff. The purpose was to identify specific coping strategies measured by the WCCL-R and COPE and explore the possible relation to perceived mental and physical health issues. Mental health dimensions were measured using the Symptom Checklist-Revised (SCL-90-R; Derogatis, 1981), and physical health dimensions were assessed by the Cornell Medical Health Questionnaire (CMI; Abramson, Terespolsky, Brook, & Kark, 1965). This study is designed to observe relations between coping physical health and mental health as well. A linear regression was run to identify which coping strategies, if any, had a significant impact on perceived mental and physical health illnesses. The results showed that 47% ($F = 2.28, p < .01$) of the variance in perceived mental health symptoms could be attributed to coping strategies alone. Coping strategies were responsible for 40% ($F = 4.50, p < .001$) of the variance in perceived physical illness. It was observed that the biggest predictor of both perceived physical and mental illness was forced and venting emotion. The purpose of this exploratory study was to identify which coping strategies were adaptive and which were particularly harmful to the perception of mental and physical illness.
141. "Early Ordovician Mass Extinctions in Colorado, New Mexico and West Texas"

Author: Matthew Morgan  
Faculty Sponsor: John Taylor

Biostratigraphic research undertaken to establish the sequence of faunal changes and paleoceanographic events that took place during the Skullrockian-Stairsian Stage transition in the Early Ordovician was conducted at several sites located in Colorado, west Texas and southern New Mexico. The primary goal was to determine the order (in time) of previously poorly documented extinctions within the trilobite and conodont faunas and a significant change in ocean chemistry reflected in a strongly positive shift of carbon 13 values in the limestone from which the fossils were recovered. The new data acquired in this study significantly improve correlation of rock units across the southwestern United States and assists in recognition of age-equivalent intervals elsewhere in the world. These data also constrain the potential causes of these extinctions that occurred on the shallow marine shelf during the early Paleozoic Era, roughly 480 million years ago. Comparison of this Early Ordovician faunal turnover to the more familiar Late Cambrian marine-shelf extinctions has revealed various similarities and differences. All have substantial positive carbon 13 excursions, major extinctions among the trilobite and conodont faunas, and brachiopod "pavement" layers, which could represent the recorded profiliations of opportunistic or disaster taxa. The Early Ordovician event differs from the earlier (Cambrian) marine-shelf extinctions by exhibiting non-synchronous trilobite and conodont faunal turnovers, and an absence of a deep-water olenid trilobite invasion stage. Recent analysis of several conodont samples, along with thorough evaluation of the physical characteristics of the rocks in the boundary interval, suggests the possibility of a gap produced by erosion or non-deposition, which could explain the absence of evidence of an olenid stage in this extinction event. The discovery of the trilobite genus Kianella appearing low within the Paraplethopeltis trilobite Zone (which defines the base of the Stairsian Stage) conflicts with earlier studies that treat that genus as a defining component of the overlying Leostegium-Kianella trilobite Zone.

142. "Effects Antidepressants & Alcohol Have on Daphnia"

Authors: Alyssa Fischer, Matthew Herbert, Taniel Orr, Nicole Peterson, and Megan Phillips  
Faculty Sponsor: Barkley Butler

Our hypothesis was that antidepressants will not change the heart rate of Daphnia, that alcohol will decrease the heart rate and that together they will have a drastic effect. To test this, Daphnia were exposed to antidepressants, alcohol, and a mixture of the two. There was no effect on the heart rate with the antidepressants, but with alcohol, the heart rate decreased and with alcohol and the antidepressants mixed, the results were similar to the effect of alcohol alone.
"Expression of Host Macrophage Cytokines on Infection with Various Mycobacterium avium Wild Type and ssGPL Mutant Strains."

Authors: Yang Dai and Danielle Dunton

Faculty Sponsor: Vida Irani

Mycobacterium avium complex (MAC) can cause severe disease (localized Tuberculosis or disseminated disease) in immunocompromised patients. The complex consists of various serovars and morphologic forms that vary in virulence. MAC's unique cell wall structure is associated with its virulence and drug-resistant nature. Glycopeptidolipids (GPL) are located on the surface of MAC cell wall. Two forms of MAC GPLs are present: serovar-specific glycopeptidolipids (ssGPL) and the apolar non-specific GPLs (nsGPL). ssGPL has the same structure as nsGPL except for an oligosaccharide (ss) attached on nsGPL. The same nsGPL can be found in all MAC strains. Only ssGPL varies among strains, thus classifying MAC into 28 different serovars. In this experiment, two MAC wild type (wt) serovars, serovar-1 (MAC 104), serovar-8 (920A6 SmO) and their ssGPL mutants, 209R.5 (serovar-1'serovar-2 ssGPL) and 213R.4 (ssGPL null mutant of serovar-8 920A6) were used to infect murine macrophage cell line (J774A.1) with multiplicity of infection (MOI) of 5:1. These mutants were compared to the wt to determine if ssGPL is involved in M. avium pathogenesis. After 1h infection, the supernatants were collected and used to determine cytokine expression (TNF-alpha and IL-12). If ssGPL is involved in pathogenesis, then absence of ssGPL will result in low cytokine expression. Also, it is hypothesized that different serovars induce different levels of cytokines. This research study will address the above hypotheses and its goal is to elucidate the early events associated with M. avium infection as a means to identify potential alternative therapeutic targets that alter the pathogenesis of infection.

"Generating Genealogy Through Linear Algebra"

Authors: Dana Hambach and Annaiese Weldy

Faculty Sponsor: Navaratna Channa

Dana and I are going to retrieve our ancestry documents from our parents and information from a genealogy center near IUP. We are going to pick a date from around the 1400's and find the number of children each of our ancestors attained over the years. As soon as we have the data we will enter the numbers into a matrix. From here we will use linear algebra to find a difference equation that will generate our genealogy. Then we will compare our equations and genealogy.

Author: Zachary Campbell
Faculty Sponsor: Ray Beisel

Have you ever thought gas prices were too high? More and more people tend to think that every day. Gas prices just seem to always go up, and never come back down. There is now an alternative to the gas we use everyday and are so accustomed to: hydrogen. The element hydrogen is the lightest and the simplest of all the elements that are known to science. Within the element itself, there is only a nucleus containing a single proton that is surrounded by a single electron. Hydrogen combines with oxygen to produce water and no other by-products. When hydrogen atoms are separated from water molecules enough energy is released to power a vehicle. Combustion engines and will run more efficiently when hydrogen is a part of the fuel mixture. When hydrogen is used as internal combustion fuel, it can help reduce global warming. The process in which we distill hydrogen from water is called electrolysis. The word "lysis" means to dissolve or break apart, so the word "electrolysis" literally means to break something apart (in this case water) using electricity. Once hydrogen has been distilled it can be used as a fuel source. Using hydrogen as an alternative fuel source can benefit our economy in many was, such as there will be fewer pollutants in the air, society will pay less when they fill up their gas tanks, and there is much water which means there is plenty of hydrogen to be distilled.

146. "How Lithium Disrupts Circadian Rhythms for Cadmium Toxicity in Paramecium tetraurelia"

Author: Kristin Juhasz
Faculty Sponsor: Robert Hinrichsen

Paramecium behaviors can illustrate mechanisms that influence biological rhythms and cellular processes. Using Paramecium tetraurelia wild type strain 51s and a cadmium chronotoxicity assay, we have shown that exposure to lithium alters the circadian rhythm of Paramecium. Lithium disrupts circadian clocks via an unknown molecular mechanism. Since lithium-based medications are the drug of choice for bipolar disorder and other human psychiatric illnesses, observing how lithium disrupts circadian responses has potential clinical significance.
Identification of Oils from Viable and Nonviable Cherrybark Oak Acorns

Author: Jeffery Layton
Faculty Sponsors: Carl LeBlond and Sharon Sowa

Identification of Oils from Viable and Nonviable Cherrybark Oak Acorns J.Layton Under the supervision of Dr. S.Sowa and Dr. C.Leblond Cherrybark oak, Quercus pagoda Raf is a prized hardwood of the southern United States forests. The seeds, or acorns, of cherrybark oak contain high amounts of lipid reserves for germinating embryos, and are known to exhibit recalcitrant seed behavior. In other words, unlike 'orthodox' seeds which can withstand drying to low moisture contents, cherrybark is desiccation sensitive and rapidly loses viability with loss of water. Little is known about the chemical nature of the oils, and how the composition might change as seed viability is lost. In this study Oils from fully-hydrated viable cherrybark oak acorns as well as dehydrated nonviable cherrybark oak acorns were analyzed for changes in molecular structure using a combination of gas chromatography, mass spectrometry, and nuclear magnetic resonance spectroscopy. The oils were extracted from both hydrated and dehydrated acorns and NMR spectra were taken. Furthermore a transesterification of both oils was done to obtain the fatty acid methyl esters and was analyzed using gas chromatography coupled with mass spectrometry. Analysis showed that the triglycerides of both oils contained octadecenoic acid and hexadecanoic acid. Further work will focus on determining the ratio of the fatty acids in the triglyceride, the specific structure of the octadecenoic acid and how these correlate with the viability of the acorns.

Iris Recognition for Personal Identification for Access to Handheld Devices

Author: Robert Trimble
Faculty Sponsor: Soundararajan Ezekiel

Biometrics deals with identification of individuals based on their biological or behavioral characteristics. Iris recognition is one of the newer biometric technologies used. It is one of the most reliable and widely used biometric techniques available. The goal of this research is to develop a wavelet based biometric identification algorithm for PC/network access. This technique is very important due to widespread use of PCs and handheld computing devices in use today, and valuable resources available on networks and the internet. Further, our algorithm will enhance the scanned image, reduce noise to the maximum extent possible, extract the important features from the image and match those features with data in a database.
149. "Laser Launch"

*Author: Derek Gladysiewski*

*Faculty Sponsor: Feng Zhou*

Design and construct circuit for a model rocket launch pad. The circuit will be using an Infrared diode to complete the circuit for the engine’s ignition.

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150. "Learn Your White Powders through Guided Inquiry"

*Authors: Jason Grimm, John Kanyan, and Robert Putala*

*Faculty Sponsor: Anne Kondo*

Forensic chemistry experiments are traditionally presented in a "cookbook" format where the students are given the procedure and results, and perform the experiment solely for visual confirmation. Guided inquiry experiments provide less information to the students initially, and through the experiment the students draw their own conclusions. Because the students learn on their own, their retention and understanding of the chemical processes is greater than were they to perform a "cookbook" style experiment. In this project, we turned a conventional experiment about infrared spectrophotometry into a guided inquiry experiment. The traditional approach is to provide the students with the identity of substances and have the students verify the identities. We modified this experiment by having the students analyze three unknown white powders and identify them.

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151. "Magic Squares in relation to Identity Matrices"

*Authors: Tiffany Cornman, Ean Livingood, Jennifer Price, and Jeffrey Wittmer*

*Faculty Sponsor: Channa Nisantha Navaratna*

For the Undergraduate Conference this April our group has prepared a presentation dealing with magic squares. After preliminary research we have discovered that placing magic squares into reduced row echelon form creates hidden patterns. These patterns can only be viewed after exploring what happens when a magic square is placed in reduced row echelon form. There are around 880 known magic squares in the world. We have stated testing some of these magic squares. Our preliminary findings show that a select few magic squares reduce to a true identity matrix. The remaining tested magic squares have reduced to very simplistic patterns. We will continue this research and present our findings at the Undergraduate Conference this April.
152. "Modifying the Physical Properties of Indomethacin by Co-Crystal Formation"

Author: Elizabeth Paladin
Faculty Sponsor: Heba Abourahma

Many organic molecules which are used as active pharmaceutical ingredients (APIs) exhibit polymorphism. This property of APIs leads to problems in the production of APIs in the solid state. The goal of this research project is two-fold: the first goal is to study the phenomenon of polymorphism. The second goal is to study co-crystal formation as an alternative to polymorph formation. Specifically, the objective of this study is to form co-crystals of indomethacin (C19H16ClNO4), an anti-inflammatory API. In order to accomplish this, non-covalent interactions, which are spontaneous and reversible under thermodynamic equilibrium, are exploited. Indomethacin has been combined with several co-crystal formers, identified based on known favorable interactions between functional groups. The co-crystal formers we used to date include isophthalic acid, benzoic acid, acetamide, phenol, p-aminobenzoic acid and urea in a variety of solvent conditions and at a variety of stoichiometric ratios. The products from the co-crystallization experiments have been characterized by melting point determination and proton nuclear magnetic resonance (1H NMR). This poster will discuss the results from the co-crystallization of indomethacin with the above mentioned co-crystal formers and show that generally indomethacin crystallizes with itself more readily than with any of these compounds under the given conditions.

153. "ODP Eastern Equatorial Pacific Leg 138 Deep Marine Sediment Cores: Eolian Dust Providing Insight Into Past Climate Conditions"

Authors: Ashley Hague and Christina Ritter
Faculty Sponsor: Steven Hovan

Deep marine sediments are comprised of a mixture of biological fossils and continentally-derived sediments (mostly eolian dust). As such, they provide an excellent opportunity to study past changes in global climate, ocean currents, and atmospheric circulation. In collaboration with colleagues from UC Santa Cruz, we are examining a N-S latitudinal transect of sediment cores in the tropical Pacific to study high-resolution paleoceanographic and paleowind records spanning the past four to five million years, a period of time when the Earth's climate system transitioned from a relatively warm northern polar region to one dominated by long term ice-age cycllicity. This also represents a time when the modern Pacific El-Nino system developed.

Currently at Indiana University of Pennsylvania's (IUP) Marine Geology lab, we are processing samples from the Ocean Drilling Program's (ODP) deep marine sediment cores of Leg 138 from the eastern equatorial Pacific. The eolian dust within these samples is isolated using wet-chemical procedures to sequentially dissolve biological and authigenic mineral components. We will then use an electronic particle size analysis system to complete a detailed grain-size profile of the eolian dust. Variations in grain-size can tell us how strong the prevailing winds were in the past and help define the regional pattern of
winds. Specifically, we hope to track the ancient location of the Inter Tropical Convergence Zone (ITCZ), the area where the southeast and northeast Trade Winds meet. Both short-term seasonal changes and longer-term global shifts in climates cause variations in the strength of the Trade Winds and the latitudinal position of the ITCZ. This in turn exerts a significant influence on oceanic surface current circulation, nutrient profiles, and biological productivity in the equatorial Pacific region. Our work is funded by grants from IUP's School of Graduate Studies and Research and the National Science Foundation (NSF).

154. "Optical Properties of Thin Crystalline Materials"

Author: Marissa Umbel
Faculty Sponsor: Ajawad Haija

This is a research oriented project that aims at studying the basic optical properties of thin coatings and crystalline materials. The targeted properties in the early stages of this proposed plan are the reflectivity and transmissivity of selective thin films and crystalline materials that will be carried out in the visible range of 350–700 nm wavelengths.

This work represents one of two phases of a more comprehensive study of these samples. In this phase, the measured values of the reflectivity and transmissivity will act as a first optical characterization of the samples. The results should relate to several parameters pertaining to the chosen samples. Among these parameters are: thickness of the sample, their optical constants, and their electronic structure. The measured reflectivity and transmissivity of each sample will be used to calculate the optical constants of the sample. This in turn will shed some light on the sample's electrical properties. The measurements will be done via a high resolution spectrometer, and all measurements will be carried out for normal incidence. In the second phase that will be carried out by another worker on this problem and will follow after the first phase is completed, theoretical computation of these properties will independently be carried out using a C++ program. Both results, experimental and theoretical will then be compared and analyzed. Any discrepancy should be related mainly to the samples preparation conditions and thickness characterization as well as literature documented of their optical constants. The study should hopefully lead to answering some of these questions.

155. "Phosphorylated Insulin and its Effect on Glucose Uptake in Adipocytes"

Authors: Kalpana Suresh and Kristen Taddie
Faculty Sponsor: Barkley Butler

Diabetes mellitus affects many Americans in the world today. Insulin injection is a common treatment for hyperglycemia; however, there is the risk of hypoglycemia, which causes fatigue, nausea, and coma. We hypothesized that phosphorylated insulin could
prevent hypoglycemia by the mechanism of a glucose-sensitive phosphotase on target insulin cells. We tested this hypothesis by chemically phosphorylating insulin and observing its effect on glucose uptake in cells. We found that phosphorylated insulin prevents hyperglycemia, but results about its effects on hypoglycemia are inconclusive.

156. "Protein-Protein Interactions Govern Homologous Recombination and Genome Stability"

Author: Lindsey Cox
Faculty Sponsor: Jana Villémain

Homologous recombination is an important process in the maintenance of a functional genome as well as in the evolutionary process. In eukaryotes it is an important mechanism for repairing double-stranded DNA breaks, segregating genes during meiosis, and resolving stalled replication forks. Mistakes in the control mechanisms of homologous recombination are often linked to genome instability, a precursor to the development of cancer. For this reason, along with its importance to cellular function, the mechanism of homologous recombination and its mediation are being studied. Rad51-recombinase has a central role in homologous recombination and is thought to be the focus of homologous control mechanisms.

Recent studies have demonstrated that Srs2 helicase modulates recombination mediated by Rad51 in S. cerevisiae. The current models suggest that Srs2 asserts control over recombination initiation. The overall goal of this research project is to characterize the protein-protein interactions between Srs2 helicase and Rad51 in vivo. This goal will be achieved by using S. cerevisiae as a simple model for eukaryotic systems. S. cerevisiae are often employed for this purpose due the significant homology and easy manipulation in a laboratory setting. S. cerevisiae is also a useful system because a large body of information is available about the genome and the proteins it encodes.

Protein-protein interactions will be investigated using a yeast two hybrid system (Matchmaker Yeast Two-Hybrid System 3 from Clontech). The regions of Srs2 protein involved in interaction with Rad51 will be located in future studies by mutating the Srs2 protein and observing how it alters the protein interaction. The Two-Hybrid System allows the detection of protein-protein interactions via the expression reporter genes responsive to transcriptional activation only in the presence of target protein interactions.

These experiments require stocks of control vectors and cloning vectors as well as the DNA for the proteins we wish to test. These stocks have been prepared from kit plasmids as well as acquired from P. Sung, and the identity confirmed by restriction digest and analysis with agarose gel electrophoresis. Preliminary experiments are currently underway to characterize the range of protein-protein interactions that can be detected with the Matchmaker yeast two-hybrid system along with investigation of the essential protein-protein interactions between Srs2 helicase and the Rad51 recombinase.
"Relationship Satisfaction as a Function of Gender Roles, Intimacy, Power and Aggression"

Authors: Jenna Mercadante and Kelly Yetsko
Faculty Sponsor: Maureen McHugh

Schwartz (1994) argues that egalitarian relationships are superior to traditional romantic relationships in relationship satisfaction. As described by Schwartz, egalitarian relationships are characterized by high levels of intimacy, shared housekeeping and child care responsibility, and shared decision making. This study examines the relationship of intimacy and decision making to relationship satisfaction. Several measures of gender role attitudes were included to examine the relationship of egalitarian and traditional gender role attitudes to relationship satisfaction and experiences of intimacy and decision-making. Finally, the study examines the degree to which experienced abuse impacts satisfaction, and correlates with egalitarian gender role attitudes. It was hypothesized that: intimacy and decision making would correlate with relationship satisfaction; college aged women more than men would endorse egalitarian attitudes; that egalitarian attitudes would correlate positively with relationship satisfaction; that violence would be negatively correlated with relationship satisfaction; and that traditional gender roles would be negatively correlated with violence and egalitarian attitudes. One hundred and twenty five college students who were recently or currently involved in a serious romantic relationship were identified through the subject pool at a mid sized public university. The final sample included 103 of these subjects recruited for the study, 72 women and 31 men. Participants completed: Dyadic Adjustment Scale by Spanier (1976), Traditional-Egalitarian Sex Roles Scale by Larsen and Long (1988), Hyperfemininity by Murnen and Byrne (1991) or Hypermasculinity by Mosher and Sirkin (1984) Scales by, Index of Spouse Abuse by Hudson and McIntosh (1981), Miller Social Intimacy Scale by Miller and Lefcourt (1982) and the Decision Making Scale by Frieze and McHugh (1992). As predicted, women reported more egalitarian attitudes. Egalitarian attitudes resulted in less relationship satisfaction for women (but not for the total sample). Egalitarian attitudes were negatively correlated with hyper-femininity and hyper-masculinity. As predicted, there was a negative correlation between egalitarian scores and reported experience of physical and non physical acts of abuse. Regression analyses indicated that the best predictors of relationship satisfaction for college students were: intimacy, egalitarian attitudes and non-physical violence. Relationship satisfaction for female college students was predicted by intimacy, nonphysical violence, and egalitarian attitudes. These and other findings are discussed.

"Role of Srs2 helicase protein"

Author: Hong Yin Ker
Faculty Sponsor: Jana Villemain

Long term exposure to high-energy radiation, chemical and DNA damaging agents will result in Double Strand Breaks (DSBs) that can cause genomic instability. In human, genomic instability is the hallmark of cancers. Homologous recombination (HR) is important for DNA repair DSBs and genome maintained but uncontrolled recombination
may result in gross chromosomal rearrangement and cell death. Normal cells possess signals that allow DNA repair jobs to function well. However, cancer cells often display indiscriminate chromosomal arrangements and chromosomal damage that due to the breakdown of DNA repair system or the regulation of DNA repair system. In order to temper recombination, cell requires DNA helicases to unwind joint DNA molecules. According to both genetic and biochemical studies in yeast, Srs2 helicases protein interacts with primary recombination protein, Rad51 and mediate the initiation of recombination events. In the study of HR and DSB repair, Saccharomyces cerevisiae served as a model system because its complete genome sequence is useful as a reference toward the sequence of human. In addition to the ease of gene manipulation facilitates analysis and allows the insertion of plasmid from other eukaryote.

Moreover, recent research indicated that Srs2 also related to genomic maintenance and stability. Srs2 found to interact directly with the modified DNA replication protein called SUMO-modified PCNA for the purpose of ssDNA protection from Rad51 interference during DNA replication. As the role of Srs2 continually evolves with every study conducted, the primary goal of our research is to acquire more knowledge of the role of Srs2 in the genomic maintainance and able to characterize the interaction partner of Srs2 among known recombination proteins. Furthermore, yeast gene and protein sequence will be subjected to the search for homologous mammalian proteins by using widely available public database and bioinformatics tools. The search for homologous proteins will serve as a precursor in determination of 3D structure of Srs2 by structural comparison. This research will provide a foundation for further studies aimed at revealing a deeper understanding of the structural and functional aspect of Srs2's ability to exhibit a multi-faceted approach to the maintenance of a stable genome.

159. "Statistical Inference as Complex Pattern Discrimination"

Author: Patrick Clark

Faculty Sponsor: Cora Sherburne

Lewicki, Czyzewska, and Hoffman (1987), demonstrated that people can acquire complex processing rules about patterns of stimuli and how to process them, even though they are unable to articulate these processing rules. Even nonhuman animals have demonstrated the ability to acquire complex discrimination abilities through operant conditioning. Porter and Neuringer (1984), for example, showed that pigeons were able to learn to distinguish between samples of the music of Bach and Stravinsky and to correctly identify novel samples after such training. Similarly, Watanabe and Sakamoto (1995) trained pigeons to do the same with paintings by Monet and Picasso. If organisms are capable of acquiring such complex discrimination abilities as those described above through operant conditioning, it is possible that they might also be capable of acquiring the ability to do statistical inference in a similar manner. The purpose of the proposed study is to determine whether or not students can learn to do statistical hypothesis testing based strictly on visual information. Students will be shown pairs of histograms representing data and asked if they think the two graphs presented are "different enough". A "Yes" response will be correct if
p(chance occurrence) is < .05 and "No" response will be correct if p(chance occurrence) is > .05. Two conditions will be used; one in which the 460 training graphs are presented in order from least to most difficult discriminations and one in which the same graphs are presented but in randomized order. Participants from two Research Design and Analysis I classes will be tested first with 20 baseline trials and then assigned randomly to one of two groups. In the experimental group, the 460 pairs of training graphs will be presented in order of escalating difficulty. In the other group, the control group, identical graphs will be presented, but in random order. All students will be tested with the same 20 novel test pairs, presented in the same (nonescalating) order. We expect that students in the experimental group will perform significantly better on test trials than students in the control group and that both groups will show improvement when baseline and test-trial performance are compared. It is possible that performing this task will enhance the participants' understanding of the factors involved in null hypothesis testing (i.e., between-group variability, within-group-variability, and number of observations) and how the factors are interrelated. Additionally, the results may provide insight about statistical inference and complex discrimination learning.

160. "Sub Graph Isomorphism Detection Methods"

Authors: David Carley, Jeananne Hickey, and Joshua Himmer
Faculty Sponsor: Channa Nisantha Navaratna

Objectives for this project are to show examples of computing methods for detection of sub graph isomorphism. Evaluating the complexity of both a computer algorithm (many exist) against molecular computation (an emerging field). Although running a computer program to detect isomorphism exist, they are inefficient as it is trying to evaluate an algorithm of non-deterministic complexity, and most likely use heuristics or linear optimization. However with molecular computation, the results are exact: using mix and split of DNA to generate an inverse deterministic space, and agarose gel electrophoresis to extract those conditions which SAT the conditions of the graph isomorphism. This can be done in O(n), which is very efficient and deterministic for a complex problem of NP.

161. "Surface Mining in Pennsylvania"

Author: Mark Gawel
Faculty Sponsor: Joseph Clark

The coal mining industry of Pennsylvania is dynamic and always evolving. With current economic trends opening up new possibilities for surface mining operations, many areas that were once uneconomic have now become viable. This research provides an in depth look at developing a Lower Freeport (the so-called "D" Seam) reserve present along the West Branch of the Susquehanna River to the northwest of Barnesboro. The Lower Freeport is of the Allegheny Group, Middle Series, Pennsylvania System. Reserve
calculations have been estimated at 42,000 tons of coal, with less than 45 feet of overburden at any given point along mining area. This area is currently under permit by a local mine operator, that is mining Lower Kittanning (the so-called "B" Seam) reserves. However, because of costs associated with removal of a 20 foot section of overlying massive sandstone, the Lower Kittanning mining cost has become non-profitable. This research is aimed at identifying additional recoverable coal reserves within the permitted area. In studying both thickness (Isochore) data and elevation data from a series of bore holes and Lower Freeport deep mine data, the area has been identified as a viable surface mining operation. In determining both the geologic trend of the coal seam and overburden, this research provides constraints on the paleoenvironment. The area to be mined is on the eastern edge of an adjacent Lower Freeport deep mine that was mined during the 1940's. The overburden calculations, structure contours, and isochore data were analyzed using Geographix.

162. "Synthesis and Characterization of Quaternary Adamantine-Like Chalcogenides"

Author: Beth Leverett
Faculty Sponsor: Charles Lake

I2-II-IV-VI4 compounds are of interest as potential precursors to novel magnetic materials; however lithium-containing I2-II-IV-VI4 materials are only beginning to attract attention. The compounds Li2CdSnS4, Li2MnSnS4, Li2FeSnS4 and Li2FeGeS4 adopt the adamantine-like structure in which all atoms possess a tetrahedral environment. These compounds were synthesized using standard high-temperature solid-state synthesis techniques. Initial reaction conditions were determined using differential thermal analysis. Further reactions were prepared to optimize crystal growth. The purity of the products was examined with powder X-ray diffraction and energy dispersive spectroscopy. Band gaps were determined from diffuse reflectance UV-Vis-NIR spectra. The crystal structure of a potentially isomorphous compound, Li2ZnSnS4, was determined from single crystal diffractometry. This structure possesses cationic substitutional disorder between the zinc and lithium ions. Finally, the diamagnetic Li2ZnSnS4 was doped with Fe2+ ions to create new materials with potentially interesting magnetic behavior.

163. "The application of the NBI model to a variety of molecule types containing a stereochemical lone pair."

Author: Michael Deible
Faculty Sponsor: Ronald See

The lone pair effect is based on the observation that a nonbonding electron pair on the central atom will distort the geometry of a molecule. Using the Non-Bonded Interaction (NBI) model as a framework, the lone pair effect has been explained as the maximization of radial space for the electron pair about the central atom. However, the work leading to this
explanation used only the simplest (AX2E) molecule type displaying the lone pair effect in its analysis, and it is not clear that this conception can be extended to more complex molecule types. Therefore, a computational study, at the MP2/6-31G** level, was undertaken to determine if this conception of the lone pair effect can be extended to the AXnE (A = S, Cl, Se, Br; X = H, F, Cl; n = 3-6) molecules. The results show that the explanation of the lone pair effect found in the AX2E molecules is generally applicable to these more complex species, and the stabilization energy of the lone electron pairs is a function of the number of X atoms.

164. "The Case of the Exploding Mailbox"

Authors: Maura Barrett, Daniel McDermott, Katelyn Myers, and Brittany Rodgers
Faculty Sponsor: Anne Kondo

In our lab, "Case of the Exploding Mailbox," we used the original standard procedure and developed it into an in-depth guided inquiry lab. Using our conventional chemical composition analysis lab, we were able to create the guided inquiry by deeper investigation into the chemical reactions and procedures. This investigation asks students to record all observations and draw conclusions, opposed to detailing and explaining the outcome in the instructions. The questions purposed in this lab will be more related to observations rather than on the procedure itself. Also, the questions will be more unique by asking the students to depict a mental image of the reaction between the chemicals in their report. The procedure will be tested by us and another group of students to evaluate our changes to the lab.

165. "The Effects of Combining Alcohol and Caffeine on Daphnia's Heart Rate"

Authors: Ashley Hill, Brittany Johnson, Alydia Johnston, Roshni Thakkar, and Ansley Uhron
Faculty Sponsor: Barkley Butler

Caffeine acts as a metabolic and nervous system stimulant that causes increased heart rate and alertness. Alcohol is absorbed by all parts of the gastrointestinal tract by simple diffusion and acts as a central nervous system depressant that causes decreased heart rate, breathing rate, and blood pressure in humans. Daphnia are small water crustaceans often called water fleas. Since caffeine acts as a stimulant and alcohol acts as a depressant, a certain combination of the two should have a neutral effect on a Daphnia's heart rate.
166. "The Effects of NyQuil and DayQuil on Heart Rate"

**Authors:** Jenelle Cannon, Ashley Rishel, Katharina Smith, and Shari Williams  
**Faculty Sponsor:** Barkley Butler

In this experiment we tested two over-the-counter cold/flu medications; a non-drowsy formula, DayQuil; and a drowsy formula, NyQuil to determine how each would affect the heart rate of Daphnia pulex. NyQuil contains the antihistamine Doxylamine Succinate which may have the side effects of dizziness as well as drowsiness while DayQuil contains the ingredient Pseudoephedrine HCl which produces similar effects as Epinephrine. In the experiment we decided to test how four different concentrations of each Dayquil and Nyquil may affect the rate at which the organism Daphnia's heart beats (.04%v/v, 1%v/v, 4%v/v, and 10%v/v).

We also performed the same steps on the Daphnia using the pond water that the Daphnia was taken from in order to give us an idea of the average heart rate and to create a constant variable for us to compare. The results illustrated that different concentrations of Nyquil and Dayquil have an effect on the circulatory system because the heart rate increased with Nyquil and then gradually decreased over time and the heart rate decreased automatically and drastically when introduced to the Dayquil.

167. "The role of p53 as a potential prognostic indicator for prostate cancer."

**Author:** Kyle Weber  
**Faculty Sponsor:** Seema Bharathan

In 2001, it was estimated that prostate cancer, by 2010 would be the most commonly diagnosed cancer in the United States, with approximately 180,400 new cases being diagnosed. One of every eight men in the 60-79 age group will be diagnosed with prostate cancer; by comparison, one in fifteen women of the same age will be diagnosed with breast cancer. These statistics illustrate the severity of prostate cancer and the need for better diagnosis and prognosis procedures. Little is known about the pathogenesis of this disease and the molecular genetic events that contribute to its development. Molecular studies have begun to reveal the biological characteristics of this disease, notably, the loss of genetic material as determined by studies of oncogene (cancer gene) activation. In the past decade numerous studies have been done finding that the involvement of several genes has been described in the promotion and progression of prostate cancer. One specific gene that is believed to play a significant role in the growth of prostate cancer is tumor suppressor gene p53. I received patients' samples from all over western Pennsylvania and performed monoclonal antibody analysis to determine whether p53 can be used as an indicator. The slides were incubated at 4 C overnight, using monoclonal antibodies for p53 at respective dilutions of 1:10, 1:100, 1:200, and 1:400 in phosphate-buffered saline solution. Biotinylated antimouse immunoglobulin G was applied at 1:200 dilution at room temperature for 60 minutes. The slides were rinsed using phosphate-buffered saline solution for 30 minutes, incubated with peroxidase-conjugated streptavidin at 1:400 dilution in phosphate-buffered saline at room temperature for 45 minutes, and then rinsed again using...
phosphate-buffered saline for 30 minutes. The color was developed by incubating the slides in 0.06% diaminobenzidine in phosphate-buffered saline for 15 minutes, and the slides were then rinsed in tap water, counterstained using Harris hematoxylin, dehydrated, coverslipped, and viewed under an optical microscope. This research is still on going and the concluding results should determine that p53 is linked to tumor stage of prostate cancer.

168. "The Upper Cambrian Thrombolite II Diversification Event"

Author: Mallory Zelawski
Faculty Sponsor: John Taylor

This project involved description of the trilobite (ancient cockroach-like marine organism) fauna within the second large bacterial reef interval ("Thrombolite II") in the Conococheague Formation. This thick package of limestone is well exposed in cliffs along the C & O Canal in Maryland and in pasture exposures in Virginia at the northern end of the Shenandoah Valley.. These rocks formed during the Late Cambrian, more than 500 million years ago, when Maryland and Virginia were part of the continental shelf covered by a shallow ocean. The shelf experienced numerous minor sea level fluctuations that are reflected by repetitive changes in the fossils and rock types within the Conococheague. Thrombolite II records a fairly large sea level rise that caused accumulation of up to seventy-five (75) feet of microbial reef and associated sediments. Collections made at various levels through the Conococheague allowed construction of a time scale that is useful for dating the major sea level changes. The goal of this study was to identify the trilobite species present in Thrombolite II, in order to determine precisely when in the Late Cambrian that sea level rise occurred. With the species identified and age determined, the final step was to correlate Thrombolite II with formations of similar age in western North America, such as New Mexico, Oklahoma, and Alberta. By identifying the intervals of rock that formed at the same time outside the Appalachians, it was possible to determine whether the sea level rise that created Thrombolite II was only a local change, or whether it caused a change in environmental conditions elsewhere as well.

169. "Title: Trilobites (fossils) of the third microbial reef interval ("Thrombolite III") in the Conococheague Formation of Maryland and Virginia: "

Author: Nicholas Welsh
Faculty Sponsor: John Taylor

The Conococheague Formation is a Cambrian/Ordovician limestone approximately five hundred million years exposed in the cliffs along the C&O Canal Historic Park and in pastures of the Shenandoah Valley of Virginia. The formation contains an interesting variety of rock types packaged into cycles that reflect periodic rises and falls in sea level. When sea level rose, bacterial reefs (thrombolites) grew to significant size, measuring tens of meters in thickness. This occurred four times during deposition of the Conococheague.
The four thick packages of microbial reef are numbered from bottom to top for ease of reference. The focus of this study was the fossils from the third interval known as Thrombolite III. Like modern reefs, those of the Conococheague supported diverse faunas. However, the dominant marine animals of the Cambrian Period were trilobites, marine arthropods resembling modern pillbugs. Primitive, worm-like vertebrates were also present, and the teeth of these organisms (conodonts) are also preserved in the limestone. Both trilobites and conodonts evolved rapidly through the Late Cambrian, and are useful for dating and correlating rocks of that age. The goal of this project was to use the fossils recovered from Thrombolite III to determine precisely when in the Late Cambrian that rise in sea level took place. Evidence of the same event could then be sought in other formations of the same age in other parts of the Appalachians and elsewhere in North America.

170. "Upper Crustal Deformation of the Central Costa Rican Forearc"

Author: Adam Boozer
Faculty Sponsor: Jonathan Lewis

Background seismic events (magnitude < 5) record brittle deformation of the crust at plate convergent boundaries such as the Middle America Trench. The strain recorded by these events is thought to reflect the nature of the down going plate. Across central Costa Rica the downgoing crust displays a southeast to northwest transition from over thickened, rough oceanic crust of the aseismic Cocos Ridge to more normal-thickness, smooth oceanic crust. This makes central Costa Rica well suited to studying the response of the overriding crust to the subduction of oceanic crust with varying characteristics. In this study small magnitude earthquake focal mechanisms are modeled to better understand the behavior of the overlying crust. The strain geometry associated with different earthquake clusters, grouped spatially, tells us about how the crust is deforming due to subduction. Deformation in Costa Rica is consistent with divergent motion to the northwest and the southeast. The geometries of strain revealed in this should reflect the neotectonics of the region, provide much-needed data for the seismic hazards community and provide insight regarding the nature of interplate coupling across convergent margins.

171. "What Does Your Chronograph Have to Say About Your Ammo? A Statistical Analysis of Common F-Class Ammunition Used at 1000 yards"

Author: Frank Battick
Faculty Sponsor: Gregory Kenning

Many articles have been written regarding the Standard Deviation - some say it's too much information while others tout that shooters are able to predict their scores solely from this little number. This paper investigates the possibility of accurately applying statistical procedures, the costs associated with doing so, and levels of precision that may be obtained when examining bullet velocity. A chronograph will be utilized to analyze the speed of the
bullet when it is in flight. Using statistical methods, conclusions will be drawn and results presented and discussed.
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